NAVAL BASE PHILADELPHIA-PHILADELPHIA NAVAL SHIPYARD
(Philadelphia Navy Yard)
League Island
Philadelphia
Philadelphia County
Pennsylvania

HAER No. PA-387

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD
(Philadelphia Navy Yard)

HAER No. PA-387

Location: On League 1sland at the confluence of the Delaware and Schuylkill Rivers, in the City of Philadelphia, County of Philadelphia, Pennsylvania.

UTM Coordinates:

	Zone	Easting	Northing
A	18	487820	4415818
B	18	487833	4415182
C	18	483439	4414788
D	18	483121	4415742
E	18	483318	4416682
F	18	483697	4416045
G	18	484939	4416258

Quad: Philadelphia, PA. - N.J. 1:24000

Dates of Construction: September 8, 1871 - January 7, 1876

Engineers/Architects: F.C. Prindle USN, W.P.S. Sanger, E.E. Potter USN

Present Owner: Commander, Naval Base Philadelphia - Department of the Navy

Present Use: Currently operating. Two-thirds of the Naval base will be converted to civilian use beginning September 15, 1995. Major shipyard elements will be retained and continue operation under Naval administration.

Significance: The Philadelphia shipyard was established by an Act of Congress in 1799, making it the United States' oldest naval shipyard. The original site consisted of eleven acres at the foot of Federal Street from Front Street to the Delaware River in the Southwark neighborhood of Philadelphia. Before purchase by the Federal Government the site was a shipyard owned by Joshua Humphreys, a prominent naval architect. On this site Humphreys supervised construction of the first ship of what would become the U.S. Navy. The vessel was christened the UNITED STATES and launched on May 10, 1797; a first class frigate of 1,576 tons displacement and mounting forty-four guns. Humphreys also designed the CONSTITUTION and CONSTELLATION both of which are still afloat. On March 3, 1801 an Act of Congress authorized

acquisition of this site from Humphreys.

In the 1870s the yard was moved to a larger site at League Island, four miles south of Philadelphia. Lack of space for expansion to accommodate new iron shipbuilding facilities led to the sale of the site on January 7, 1876. Under the aegis of the Philadelphia Naval Base, it is the sole government yard located on fresh water. One hundred and thirty-five ships were built here, thousands more were repaired and rebuilt. From 1917 to 1950 the yard also fabricated almost two-thousand Naval aircraft. The shipyard is currently completing a program of comprehensive overhaul on aircraft carriers. The industrial facilities include drydocks and the Navy's only propeller casting and finishing shop. The shipyard is active in manufacturing, process and product development. Present activities include application of advanced laser welding techniques. The high altitude pressure suit, catapult and arresting gear for carrier based aircraft were developed and tested at this site. Throughout 195 years of service the facility has earned its reputation as "Mainstay of the Fleet."

Historian: Robert C. Stewart July 1994

Project Information: This documentation project is part of the Historic American Engineering Record (HAER), a long range program to document historically significant engineering and industrial works in the United States. The HAER program is administered by the Historic American Buildings Survey/Historic American Engineering Record Division (HABS/HAER) of the National Park Service, U.S. Department of the Interior. The Naval Base Philadelphia - Philadelphia Naval Shipyard recording project was cosponsored during the summer of 1994 by HABS/HAER under the general direction of Dr. Robert J. Kapsch, Chief, and by Naval Base Philadelphia, under the command of Rear Admiral Louise C. Wilmot.

The field work, historical reports and photographs were prepared under the direction of project leader Dean Herrin, HAER Historian and Craig Strong, HAER Architect. The recording team consisted of Robert C. Stewart, Historical Archaeologist, West Suffield, CT. The historical section of the report was produced by John Bacon, Philadelphia Maritime Museum and Robert C. Stewart. Jet Lowe,

HAER, was responsible for formal photography. The interpretive drawings were delineated by Doug Anderson.

Others who contributed their time, advice, documents and help were: Jane Allen (Philadelphia Maritime Museum), Dan Cashin (Chief, Rigger Apprentice Training), Alfred Cavallero (Manager Design Branch-Public Works Engineering), Rich Chlan (Public Affairs Officer-PNSY), Ed Delany (Fire Administration), Ralph Edelman (Quality Assurance), John Fedak (coppersmith), Robert Gorgone (Deputy Business and Strategic Planning Officer-PNSY), John Hilliard (upholsterer), Ed Jones (Boilermakers), Frank Matusik (Foreman - Lofting), Frank Mellert (Architect - Public Works Engineering), Rosalie Moschella Pinto (Tacker - retired, 26 shop), Paul Niessner (Equipment Specialist - Cranes), Ed Ochmanowicz (Superintendent 31 Shop - Inside Machining), Steve Pandur (Leadingman - Fabric Workers - Sail Loft), Elaine Pelagruto (Beacon Editor), Tom Pierson (Loftsman), Cece Saunders (Historical Perspectives), Richard Scardino (Leadingman -11 shop - ship fitting), Martin Sheeron (Superintendent - Boilermakers), Commander Walter T. Talunas, USNR (Human Resources Transition Coordinator).

For additional information, see the following HAER documentation:

HAER No. PA-387-A	NBP-PNSY, DRYDOCK No. 1
HAER No. PA-387-B	NBP-PNSY, DRYDOCK No. 2
HAER No. PA-387-C	NBP-PNSY, DRYDOCK No. 3
HAER No. PA-387-D	NBP-PNSY, DRYDOCK No. 4
HAER No. PA-387-E	NBP-PNSY, DRYDOCK No. 5
HAER No. PA-387-F	NBP-PNSY, 350-TON HAMMERHEAD CRANE
HAER No. PA-387-G	NBP-PNSY, 3,000-POUND CRANE
HAER No. PA-387-H	NBP-PNSY, MANAGEMENT ENGINEERING (Bldg. No. 4)
HAER No. PA-387-I	NBP-PNSY, SUPPLY DEPT. STOREHOUSE (Bldg. No. 5)
HAER No. PA-387-J	NBP-PNSY, COMMANDER'S OFFICE-NAVAL BASE (Bldg. No. 6)
HAER No. PA-387-K	NBP-PNSY, STEEL STOREHOUSE (Bldg. No. 8)
HAER No. PA-387-L	NBP-PNSY, CARPENTRY SHOP (Bldg. No. 14)
HAER No. PA-387-M	NBP-PNSY, MACHINE SHOPS (Bldgs. No. 16 & 18)
HAER No. PA-387-N	NBP-PNSY, MACHINE SHOPS (Bldgs. No. 17 & 19)
HAER No. PA-387-O	NBP-PNSY, FOUNDRY/PROPELLER SHOP (Bldg. No. 20)
HAER No. PA-387-P	NBP-PNSY, STRUCTURAL SHOP (Bldg. No. 57)

HAER No. PA-387-Q	NBP-PNSY, AIRCRAFT STOREHOUSE (Bldg. No. 76)
HAER No. PA-387-R	NBP-PNSY, AIRCRAFT ASSEMBLY SHOP PLANT No. 2 (Bldg. No. 77H)
HAER No. PA-387-S	NBP-PNSY, STRUCTURAL ASSEMBLY SHOP (Bldg. No. 541)
HAER No. PA-387-T	NBP-PNSY, PIPE COPPERSMITH SHOP (Bldg. No. 543)
HAER No. PA-387-U	NBP-PNSY, MATERIAL ASSEMBLY SHOP (Bldg. No. 592)
HAER No. PA-387-V	NBP-PNSY, MAIN SUPPLY WAREHOUSE (Bldg. No. 624)
HAER No. PA-387-W	NBP-PNSY, RESERVE BASIN AND MARINE RAILWAY

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HISTORICAL DEVELOPMENT OF NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD

By Robert Stewart and John Bacon

PREFACE

From this nation's first actions for independence to our present position as a major world power, our history is interwoven with dramatic and valiant accounts of the American Navy. From John Paul Jones to nuclear submarines, the traditions of the American Navy are inextricably woven into the history of its fighting ships. Many of those gallant vessels were built or repaired at the old Philadelphia Naval Yard. Philadelphia has long been associated with shipbuilding and the Navy. What became the United States Navy was sired on the Delaware River when First Lieutenant John Paul Jones ceremonially raised the first American ensign over the frigate ALFRED. The date was December 23, 1775. This important event established Philadelphia as the birthplace of the United States Navy.[1]

Ever since that date, the artisans, craftsmen and shipwrights of the Philadelphia area have sweated and toiled in the creation of naval vessels. Philadelphia's ships have participated in every war in which the nation has been involved. Philadelphia-built ships defied Great Britain, controlled piracy in the Mediterranean and landed troops at Vera Cruz during the Mexican-American War. During the Civil War Philadelphia ships blockaded Southern ports and proved the superiority of steam power and screw propulsion over sail. They transported troops and engaged in decisive naval battles and invasions from the Spanish-American War to the Persian Gulf.

The Philadelphia Naval Shipyard (PNSY) is the nation's oldest, having its origins in an act of Congress in 1799. Technological changes during the latter half of the 19th century dictated a newer, more spacious facility. Consequently, this is the story of two naval shipyards, the Federal Street Yard, 1801-1876 and the League Island Yard, 1871 to the present. In addition to an overview history of the Naval facilities at Philadelphia, the report includes recognition of its dedicated workers and brief reports on specific facilities.

A shipyard is defined by its workers. The skills needed to build and renovate large ships such as aircraft carriers are numerous and diverse. A carrier must provide life support to a population of over 5,000 people in addition to maintaining defensive and offensive weaponry. The problem is parallel to providing the technology base required to build and maintain a small city.

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[1] Steven Silverman, Philadelphia Naval Shipyard/Base's Historical Roots in the Community - A Proposal for the Establishment of the Philadelphia Naval/Shipyard Base's Curator and Museum/Visitor Center. (Philadelphia: 1983): 1.

There were over 137 separate skills or crafts identified with building or repairing a ship at PNSY. For example, to build or repair a ship, lofters translated the naval architect's design into cutting and shaping patterns for the metal working trades. Based on the lofters' patterns, shipfitters cut, bent and welded flat metal to fit the hydrodynamic shape of a ship's hull. Welders bonded the component parts together. Riggers moved heavy loads and delicately positioned massive machinery with pin-point accuracy. Riggers launched a vessel over a thousand feet long down a shipway on a split-second timetable. Types of jobs range from anglesmiths to wharfbuilders and include obscure skills like grainer to obvious ones like holder on.[2]

Some skills, like rigging, have roots in the technology of ancient Egypt and the building of the pyramids. Others are founded in state-of-the-art computer and electronic technology. Most of the workers learned by doing. They are the product of an extensive apprenticeship program and on-the-job instruction working under the guidance of a master craftsman. Philadelphia's workers took pride in their skills. They held tight tolerances and exceeded quality requirements to achieve the famous "Philly finish."

A shipyard is a complex facility. The sheer size of naval vessels and their components require enormous cranes and specially-built trucks to move material. Unique vehicles, lift trucks, railroad cars, marine railways, slipways, fitting-out piers, mobile cranes and drydocks are essential to handle and accommodate massive ships and their components. The scale of metal working machinery needed to fabricate parts is commensurate; for example, lathes with a capacity of 60 inches and a length of 75 feet are unexceptional. Boring mills, presses, breaks, shears and forging hammers are massive. Shipyard fabrication equipment is of a size that is increasingly rare to see in American industry.

This report details the historical development of Naval Base Philadelphia, the Philadelphia Naval Ship Yard, and related USN institutions in the region. Naval shipbuilding is the primary focus; the PNSY is the largest and most visible USN activity in the area. The annotated bibliography serves as a guide to the papers, articles, and other printed material gathered during research. Related specialized reports listed on page three contain further details on specific technical features such as drydocks and cranes, and details about the skills and crafts associated with the shipyard.

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[2]A list of wage service ratings is included in Appendix C.

INTRODUCTION

Shipbuilding in Colonial Philadelphia

Shipbuilding was the Delaware Valley's first heavy industry. When the English colonized the area, William Penn advertised for ship carpenters and took steps to develop a maritime establishment in the colony. When clearing land, Penn required all settlers to "spare all smooth and large oak trees suitable for ship timber."

Although some small ships had been built in the colony starting in 1676, William West was the first experienced ship-wright to emigrate to the colony. In partnership with Penn, he built the AMITY. Shipbuilding enterprises succeeded and by 1700 there were four shipyards in Philadelphia. The Philadelphia yards built over 300 ships by 1710.[3] The Delaware River was equated to the major shipbuilding area of Scotland on the River Clyde. Eventually it became known as the "Clyde of America."[4]

Before 1801[5]

After the French and Indian War, Great Britain's American colonies were on the verge of open rebellion. Taxes imposed on the colonists to help pay for that war helped fuel a desire for independence. Revolution smoldered under increasingly restrictive control from the mother country. America's Continental Congress met at Philadelphia in 1775 to petition for redress of grievances against the Crown. Samuel Adams expanded this agenda. He managed to secure a Congressional pledge of military aid to any colony compelled to fight a defensive war. He also maneuvered the Congress into supporting a non-import, non-export agreement against Britain.

Adams' initiatives required a degree of naval power to impede the landing of British troops and to discourage smuggling. Congress established a Marine Committee in November of 1775 with the objective of organizing naval defenses. By the end of the year, the committee bought and fitted out the first Continental fleet -- two frigates and two brigs. On December 23, 1775, First Lieutenant John Paul Jones raised the first American ensign over the frigate ALFRED. The

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[3]Marion V. Brewington "Maritime Philadelphia 1609-1837," The Pennsylvania Magazine of History and Biography, (April 1939): 104.

[4]James Laurence Kauffman, Philadelphia's Naval Shipyards (1801-1948) (New York: The Newcomen Society of England, American Branch, 1948): 9.

[5] The following historical information is derived primarily from three sources: Kauffman's Philadelphia's Naval Shipyards; Henry M. Vallette, History of the Philadelphia Naval Yard 1609-1884 (Philadelphia: L.H. Everts & Co., 1884); and Robert S. Egan, "Two Hundred Years of Naval Shipbuilding in the Delaware Valley" (New York: The Society of Naval Architects and Marine Engineers, 1976).

Delaware River was the site of this important event and it established Philadelphia as the birthplace of the United States Navy.[6]

From 1775 to the end of the War for Independence, Philadelphia shipbuilders built or converted vessels and outfitted numerous privateers. The first vessel built for the Continental Congress was the frigate RANDOLPH. She was launched on the Delaware in 1778. The established shipbuilding trade made the city a logical naval center. Philadelphia's dominant position in the political, social, and economic life of the country also influenced its selection. By 1781, fourteen Philadelphia shipyards were in operation. Joshua Humphreys operated the largest of these at the foot of Federal Street on the Delaware in the Southwark section.[7]

While the commercial shipbuilding industry was developing along the banks of the Delaware, incidents in the distant seas off North Africa forced the United States into its first military buildup. The western Mediterranean was infested with Barbary Coast pirates who harassed and victimized American merchant vessels. These marauders roamed at will and were not deterred by the modest American naval forces in the area. The continued threat to American trading vessels in the early 1790s persuaded Congress to authorize the construction of warships in March 1794. This "Naval armament for the United States" was vital for protection of our citizens and commercial interests.

The most prominent naval architect of the period was Joshua Humphreys. Secretary of War Knox sought designs, drafts and hull models from Humphreys for six warships. Humphreys responded with a proposal to build six frigates, larger and more heavily gunned than any vessels of their class in the world's navies. Humphreys claimed these ships "could carry as many guns on one deck as the others carried on two; could work them to better advantage and, being more stable, could carry more canvas."

Humphreys' designs were innovative and practical. His use of diagonal bracing stiffened the ship's hull and precluded hogging. His concepts in warship design were later employed by the

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[6]Silverman, 1.

[7] Shipbuilding in Philadelphia has a strong hereditary tradition which continues into the present Naval Shipyard. William West and his descendants were prominent in the trade from 1676 to 1800. Penrose's shipyard, founded in 1707, lasted until c. 1857. The Penrose family also produced a woman ship-wright, Ann Penrose, who worked at the trade in the late 18th century. Joshua Humphreys apprenticed at the Penrose Yard and later designed a majority of the United States Navy's first vessels. Charles Penrose, in partnership with Samuel Humphreys, son of Joshua, built one of the Navy's first ships-of-the-line in 1815. The Grice-Bowers-Cramp ship yard remained under family control from 1760 to 1927. Brewington, "Maritime Philadelphia," 105.

British and other navies.[8] Humphreys personally supervised construction of the first ship which was launched on May 10, 1797. She was a first class frigate of 1,576 tons displacement, mounting 44 guns and christened the UNITED STATES. It was the first ship of what evolved into the United States Navy. The Continental Congress also authorized the construction of three 74-gun ships-of-the-line and twelve 32-gun frigates. One of the former and four of the latter were to be built in Philadelphia shipyards.

Humphreys later built the 36-gun frigate PHILADELPHIA which was launched in 1799. Thus, even before 1801, and the establishing of the Navy Department itself, Philadelphia played a central role in American naval affairs. Moreover, the pattern of private involvement in naval shipbuilding in the Delaware Valley was firmly established from the beginning. The advantages of Philadelphia were apparent at this significant point in technological history:

> The industrial revolution could not have taken place without men competent to develop a new technology, able to invent, build, and use precision tools and precision machines. Philadelphia had such men; it was such assets, still in the process of maturation, that persuaded the federal government, upon removal to Washington, to leave behind our institutions that required technically skilled management and workers-- the United States Mint, two arsenals, and the Navy Yard.[9]

Nevertheless, Congress had no desire for a permanent Navy. The mood of the public and politicians was to minimize military expenditures. However, the new nation was unable to protect its commerce on the high seas. French privateers interfered with trade between the United States and Great Britain. President Adams realized that the ability to protect commerce was fundamental to recognition as a nation.

In partial response to the maritime problems, a Navy Department was established on April 30, 1798, and Benjamin Stoddert was named the first Secretary on May 18th.[10] There was an undeclared naval war with France which began on May 28, 1798. Hostilities lasted until Napoleon

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[8] Kauffman, "Navy Yards," 10.

[9] Russell F. Weigley, ed., Philadelphia: A 300-Year History (New York and London: W.W. Norton & Company, 1982): 240.

[10] Marine Corps Institute, Marine Corps History and Traditions #7109B (Washington, D.C.: Marine Barracks, 1991): 7. The official birthday of the Navy is considered to be October 13, 1775, prior to the existence of the United States. An Act of Congress dated April 30, 1798 divided the War Department into a Navy Department and a War Department and is considered the organization date under the governmental authority of the Congress.

Bonaparte became First Consul of France in 1801. In 1799 Congress reacted to these maritime threats by, among other actions, establishing The Philadelphia Shipyard, predecessor to the Naval Shipyard. No action to fund the shipyard was taken at this time.

1801-1837

France was not the only menace to American commerce. Pirates in the Mediterranean continued to harass our shipping and kidnap Americans for ransom. By the time Thomas Jefferson became President in 1801, the United States had paid nearly $2 million to Morocco, Algiers and Tripoli.[11] The success of the pirates in extracting tribute led to even greater demands. Believing that he was not receiving enough tribute, the Bashaw of Tripoli declared war on the United States on May 14, 1801. The existing navy did not have the resources to deal with the Tripolitan pirates. Naval expeditions were too weak to deal effectively with the Barbary corsairs. Congress reacted by authorizing up to twelve vessels to be armed, fitted and manned.

On March 3, 1801 an Act of Congress authorized acquisition of land for several naval shipyards. Additional funds were authorized to build, maintain and outfit ships for the new Navy. For strategic and political reasons, these yards were located up and down the eastern seaboard. George Harrison, acting as an agent for the government, purchased a site in Southwark which included Humphreys' yard. The site contained eleven acres at the foot of Federal Street from Front Street to the Delaware River. The boundary ran 560 feet north on Front Street from Wharton Street to Prime Street (now Ellsworth). It cost $38,636. Later purchases brought the area up to 18.1 acres.[12] With the act of 1799 and the appropriation of 1801, the location of the first United States Ship Yard[13] was established at the foot of Federal Street in Philadelphia. Presumably, some of Humphreys' workmen and those from other yards were hired as activity picked up at the new Navy Yard (Figure 1).

Southwark had long been associated with maritime pursuits; a resolution in 1800 from its citizens plainly states their interest in the Yard (see Appendix A). Located on the southern edge

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[11] The $2 million amounted to about one-fifth of the annual revenues. It had been extorted as ransom for prisoners or as bribes to permit merchant vessels to sail the Mediterranean. Marine Corps Institute, 9.

[12] U.S. War Department, (2 Stat.123) Federal Owned real Estate Under the Control of the Navy Department (Washington D.C.: United States Government Printing Office, 1937).

[13] Vallette, 1, 3. In September, 1798, the title "United States ShipYard" was changed to "Naval Yard." The site had some earlier significance; in 1636-1637 Swedish colonizers under the sponsorship of Queen Christina founded the settlement of Wicacoe at this location. Evidence of their community, an underground powder magazine, existed at least until 1876.

of the old city, the Yard was within walking distance of the urban center, and immediately adjacent to densely-populated neighborhoods.

Some speculative operations started about a year before sale of the land had been completed. On June 11, 1800, well before ship yard activation, the keel of the frigate FRANKLIN was laid.[14] Significant repair work began almost immediately, notably on the frigate CONSTELLATION. However, the Jefferson administration did not favor the construction of large ships and deferred the Yard's development. Work on the FRANKLIN proceeded very slowly. New construction was unusual and the shipyard devoted itself to repair work.

With ships available from the building activities of the last decade of the 18th century the pirates were crushed. Successful expeditions by the Navy and U.S. Marines succeeded in suppressing piracy in the Mediterranean by.[15] Hostilities during the War of 1812 occasioned the first notable burst of activity at the new yard. The first commandant was Commodore Alexander Murray who was appointed July 8, 1813. The FRANKLIN, a 2,257 ton, 74-gun ship-of-the-line was launched on August 25, 1815. The Grice yard in Kensington, just north of the old city, built and launched the 44-gun frigate GUERRIERE under the supervision of Joshua Humphreys. The Navy Yard completed and outfitted her. This continued the practice established earlier. It became customary to contract hull construction out to local private shipbuilders and complete fitting out at the Navy Yard. Another 74-gun ship-of-the-line, the NORTH CAROLINA, was completed by the Navy Yard in 1820. By 1822, the Yard employed roughly 170 mechanics and laborers.

In the second decade of the 19th century, the navy yard laid the keel for the frigate RARITAN and the 120-gun ship-of-the-line, PENNSYLVANIA. The PENNSYLVANIA was armed with 120 guns and was the largest ship ever started in America up to that time. During times of peace, however, military expenditures decreased. The pace of construction was so slow that ships on the ways began to rot. To protect vessels under construction, two large shiphouses were built at a cost of $23,000. The first was erected in 1821-22 and the larger, northerly house

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[14] Vallette, 3.

[15] A remarkable exploit in the Tripolitan War was performed by the U.S. Consul at Tunis, William Eaton and Marine Lieutenant Presley N. O'Bannon. Eaton wanted to replace the pirate prince of Tripoli, Yusuf Karamali with his older brother Hamet. Yusuf had succeeded to the throne by murdering another older brother. Presumably, putting Hamet on the throne would have alleviated the pirate problem. During February of 1805 Eaton, O'Bannon and Hamet led an expeditionary force across 650 miles of Libyan desert and after seven weeks of marching reached the governor's stronghold at Derne. They succeeded in taking the town. It was the first time the American flag flew over a military objective in the Old World. Marine Corps, 9-10.

was completed in 1822. For most of the century, these were the most conspicuous structures in the city.[16]

Ship construction proceeded slowly, constrained by budgets, until the PENNSYLVANIA was completed in 1837 and the RARITAN in 1843.[17] Protected under the shiphouses, they were in effect "mothballed" until needed.[18] The 1837 launching of the PENNSYLVANIA was the most well-attended and significant event in the Navy Yard's early history. One period description captures the excitement shared by the entire city:

> By far the most interesting display of shipping, steamboats, and small craft that was ever witnessed on the Delaware was visible from the top of the shiphouse, and the Jersey shore looked like the masses of coal as seen on the banks of the Schuylkill. It would be a risk to hazard any calculation of the numbers assembled, but it will approach newspaper accuracy to say two hundred thousand people had their eyes riveted on the Pennsylvania when she left the structure wherein she had so long been housed. Little did William Penn anticipate the launching of such a colossus from the quiet border of his peaceful city.[19]

Unfortunately, there is little information on the lives of the mechanics and laborers responsible for the PENNSYLVANIA and other early Yard ships. Henry Vallette relates anecdotal information on particular Yard characters and types and suggests that many of the workmen overindulged their taste for alcohol.[20] These and similar characterizations may be

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[16] J. Thomas Scharf and Thompson Westcott, History of Philadelphia, 1609-1884 (Philadelphia: L.H. Everts & Co., 1884), III:2340; also notes dimensions, builder, and cost.

[17] Vallette, History, 16.

[18] Egan, "Naval Shipbuilding," 5.

[19] Quoted in Vallette, History, 40.

[20] Vallette relates:

> "Among a large body of men there will always be a certain number of skulkers, and a certain Commodore was continually on the lookout for them; if caught loitering, instant discharge was the result. On one occasion he observed one of the "sovereigns" in the laborers' gang idling his time. The Commodore called him to an account for laziness, and the fellow, with considerable sangfroid inquired, "Well, Sir! Who the deuce are you?" The old gentleman with an angry tone replied, "D--me, Sir! don't you know me? I'm the Commandant of this Yard, Sir!" With a look of affected surprise he answered, "The

described as popular mythology. Yet it is known that Yard workers celebrated launchings well fortified with spirits. Launchings often marked the beginning of slow periods and layoffs, much as they would in later years.

The extended building periods for the PENNSYLVANIA and RARITAN document the often harsh political and economic realities of naval shipbuilding. Steady employment for the nineteenth-century work force was unusual.

Two other institutions founded in this period would have a long association with the Yard. The United States Marine Corps established a barracks and parade ground in the Yard in 1807. The Marines moved to League Island with the Yard in 1876. The United States Naval Asylum opened in 1831 on the east bank of the Schuylkill just above Gray's Ferry. The Asylum was housed in a large Greek Revival building designed by the noted architect William Strickland. It functioned as a retirement home for naval officers and housed the government Naval School before the founding of the United States Naval Academy in 1845. In 1879, the Asylum became known as the U.S. Naval Home. Under the command of the Yard Commandant, it was in operation until the 1970s.[21]

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thunder you are! well, all I've got to say is, old boy you've got a devilish good billet, and I'd advise you to hold on to it." "What is your name, Sir?" asked the Commodore. The man replied, "William Ferguson of the Construction Department." An order was at once issued to the Construction Department to discharge Ferguson forthwith, but there was no such name upon the books, and the party who assumed it took good care that the Commodore did not lay eyes upon him again. On another occasion he approached one of the old stagers, a Hibernian, who was up to every dodge, but this time caught in one of the ship-houses, partially intoxicated and almost asleep; but he saw the Commodore at the very moment the Commodore saw him, and his Irish wit did not forsake him, as staggering to his feet he touched his hat and said, "Shur, Commodore, I've been a waitin to see yez. I thought mebbe ye'd be afther given a poor bye a job of wurruk so I could git the bit and the sup fur the old woman and children." The Commodore told him that there was no employment for him in the Yard, and that he had better go outside and look for it. "Thank your honor!" said Pat, and away he went to find some other shady nook wherein to finish his nap before roll-call. This kind of sharp practice could only be exercised when there was a large force employed, and even then we heard of comparatively few cases of playing old soldier." Vallette, History, 54.

[21] Vallette, History, 8; Philip Chadwick Foster Smith, Philadelphia on the River (Philadelphia: PMM, 1986): 111-112.

1838-1860

The period immediately preceding the Civil War was relatively slow considering the number of vessels and tonnage built. Employment peaked at only 300 workmen. The Yard distinguished itself, however, with a series of important advances in the field of mechanical propulsion. Most steam powered ships of this period retained sail rigs; it was difficult to carry sufficient fuel for a long voyage under steam alone. The MISSISSIPPI, commissioned on December 22, 1841, was one of the earliest side-wheeler steamers built for the Navy. It was built under the personal supervision of Commodore Matthew C. Perry. Fitting out of this first steamer at the Philadelphia Yard was completed in 1842. The MISSISSIPPI participated in pivotal events of American history.[22] She served as flagship for Commodore Matthew C. Perry during the Mexican War with George Dewey as her executive officer; the Shogun's emissaries were received on her quarterdeck in 1854; and She was present at the British and French storming of the Chinese Taku barrier forts in 1859, under Commodore Josiah Tatnall.

The war with Mexico resulted in changes in Naval warfare. Steam power was shown to be clearly superior over sail. Early amphibious invasions were made possible with the development of the surfboat for landing troops on the beaches at Vera Cruz. These forerunners of landing craft

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[22] Commodore Matthew C. Perry took command of the Gulf Squadron in March 1847. Perry organized a large combined landing force of Army and Marines and secured Alvarado on April 1, 1847. Tuxpan was captured on April 18. Marines under Perry's command helped the Army capture Vera Cruz and participated in the assault of Chapultepec and Mexico City. As the result of the Marine's participation in the Mexican War, the citizens of Washington presented the Corps with a blue and gold standard which bore the motto "From Tripoli to the Halls of Montezumas." This later became immortalized as the first line of the Marines' Hymn.

The MISSISSIPPI was Commodore Perry's flagship in 1852 when he was given command of the East India Squadron. The mission was to organize an expedition to establish trade relations with Japan. On July 8, 1853 the steamers SUSQUEHANNA and MISSISSIPPI along with the sloops of war SARATOGA and PLYMOUTH entered Tokyo (Yedo) Bay. Perry presented President Millard Fillmore's request and said he would return for their decision. In March of 1854 Perry returned to Tokyo. After elaborate ceremony and further negotiations, Perry and Japanese officials signed the Treaty of Kanagawa on March 31, 1854, opening trade with Japan. Marine Corps, 14-15.

During the Civil War the MISSISSIPPI participated in blockade duty in the Mississippi River and in the assault on New Orleans on April 24, 1862. She was ordered upriver for operations against Port Hudson and was grounded on March 14, 1863. Under Confederate fire, she was blown up to prevent capture.

were fifty feet long with a twelve foot beam and a draft of four feet. They were propelled by oars or towed. Cramp's Philadelphia shipyard developed and built them.[23]

The PRINCETON, launched in 1843, "was the world's first successful screw propelled warship. She set the pattern for most of the world's warships up to the present."[24] The propulsion system was designed by the Swedish-American engineer John Ericsson and fabricated by Merrick & Towne of Philadelphia, a leading marine engine supplier.[25]

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[23] Kauffman, Philadelphia's Navy Yards, 15.

[24] Egan, "Naval Shipbuilding," 6.

[25] Captain Richard F. Stockton, USN, had witnessed John Ericsson`s experiments with screw propellers in England. In 1841 he convinced the Navy Department to build a screw propelled vessel. Stockton engaged Ericsson to design and supervise construction of the world's first screw-propelled warship. She was named the PRINCETON after Stockton`s home town in New Jersey. PRINCETON'S hull was built at the Navy Yard and her machinery at the works of Merrick and Towne between 1841 and 1843. She was 164 feet long and displaced 954 tons. The Navy, not yet having full faith in the reliability of steamers, specified that she be ship rigged and carry 14,413 square feet of canvas. Her engines were unusual. The cylinders swung back and fourth over a 90 degree arc. The linear motion of the pistons was transmitted through connecting rods to the cranks of the rotating propeller shaft. The design performed well and was used in other early marine engines.

The PRINCETON was the first warship to have all machinery placed below the water line to protect it from shot. Her boilers were the first in the Navy to use forced draft blowers. She was the first combat ship with a retractable funnel which could be removed when under sail.

PRINCETON was the site of an accident in 1844 when a gun burst, killing Secretary of State Abel P. Upshur, Secretary of the Navy Thomas W. Gilmer, Captain Beverly Kennon, USN, and several civilians including David Gardiner of Gardiner`s Island. Pres Tyler was on Board with the company which included Gardiner`s daughter Julia. Gardiner`s body was removed to the White House and in the "resulting distress and sympathy, the president developed such an interest in Miss Gardiner that he afterward married her." Kauffman, Navy Yard, 14-15.

PRINCETON served in the Mediterranean from August 1847 to June 1849. She was surveyed and condemned to be broken up at the Boston Navy Yard in July of 1849. U.S. Navy Department, American Naval Fighting Ships (Washington, D.C.: Office of the Chief of Naval Operations, 1979), 383.

In June of 1851 the yard completed what is believed to be the world's first floating drydock at a cost of $813,742. It had a lifting capacity of 5892 tons, displaced 10,037 tons, and was 300 feet long. Shops for smiths, riggers and shipfitters lined the upper deck of the drydock and allowed relatively easy access to ships under repair. The drydock was built on pontoons which could be filled with water or pumped out to lower or raise the ship (Figures 2 and 3).

The Federal Street Yard also built PAWNEE, between 1858 and 1860. It was the first twin-screw warship in the United States Navy. The presence of specialized firms such as Merrick & Towne and Betts, Harlan & Hollingsworth in Wilmington -- then building the first iron steamships -- bolstered the stature of the Delaware Valley as a shipbuilding center.

1861-1876

Activity at the Yard picked up appreciably with the start of the Civil War. Employment leapt to 1,700 by the end of 1861 and reached a wartime peak of 2,686 in January 1862. The new influx of workers allowed the Yard to launch the 1,560 ton screw sloop TUSCARORA after a construction period of only 58 days between June 26 and August 24, 1861. James Kauffman notes that this increased pace was not without problems:

> With expanding employment, demand for wages had kept pace. The wage of shipwrights for example, rose in two months in the Fall of [18]61 from $1.75 to $3.00 per day; other skills and crafts were not lagging. An attempt to arrest this spiral resulted in a wage reduction ordered from Washington. The workers, within three days of their peak employment, 16 January 1862, struck the Yard. Using persuasion, appeals to patriotism and who knows what else, [yard commandant G.J.] Pendergrast brought the strike to a close in six days, and everyone got on with the war.[26]

The Yard constructed 12 ships with a total displacement of almost 16,000 tons during the conflict. It also maintained an average of 1,200 workers engaged in repairs to the fleet through the end of the decade. The Yard's significant contribution built up important political credit for the years to come. The Yard also hosted the Union Volunteer Refreshment Saloon, Philadelphia's most visible civic contribution to the war effort. The saloon was supported by the city's political and economic elite. It offered rest and relaxation facilities for wounded soldiers and those on leave.

Private shipyard contributions to the war effort in the Delaware Valley included many ships and almost as much tonnage as the Navy Yard itself. The ironclad vessels provided by these private yards performed well and ushered in the era of the metal-clad warship. NEW IRONSIDES, a 3,486 ton ironclad wooden frigate, was contracted to Merrick & Sons who built

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[26] Kauffman, Philadelphia's Navy Yards, 16.

her machinery. The hull itself was subcontracted to William Cramp of Kensington. Cramp and John Roach in Chester, dominated area naval shipbuilding until the end of the century. Cramp and Roach specialized in metal plating technology and their large, outlying yards were ideally adapted for this work.

In 1876, Henry Vallette documented the Federal Street yard and its shop organization (Figure 4). Prior to 1867 there had been one central storehouse and a few general departments. A federally-mandated reorganization in 1867 created eight independent departments "with a distinct head, having a store-house of its own, and a separate clerical force whose duty it was to keep the books in manner and almost the same as in private mercantile establishments, charging other departments for work done, or material delivered by it for them, and crediting them for any labor and material received." These accounts were to be settled monthly, with quarterly reports to be sent to parent bureaus in Washington, D.C. The Commandant of the Yard supervised the heads of the departments and served as the Navy's direct representative. The departments at the time were: Yards and Docks, Construction and Repair, Steam Engineering, Equipment and Recruiting, Ordnance, Navigation, Medicine and Surgery, and Provisions and Clothing.[27] Similar divisions and the attendant bureaucracy have defined elements of Navy Yard work and life in subsequent periods.

Vallette's comments on specific shops indicate a relatively low level of technology. A steam saw mill replaced pit sawing only in 1867 and a tower was built for a steam-powered riveting machine, but this "for some reason . . . was never put in operation." It may have been that the volume of work did not justify mechanization. He is sketchy on the "Iron-Plating Shop" in the Department of Construction and Repair:

> This is rather a new branch of the Construction Department, taking its name and date from the buildings of Iron-Clads or Monitors, as all the plates for the sides and decks have to be planed, and holes drilled or punched, preparatory to their being placed in position on the vessel. The necessary machinery for performing this work is here in operation.

Other shops and lofts in Construction and Repair included: Mould Loft, Spar and Boat Shop, Joiner Shop, Plumber Shop, Blacksmith Shop, Block Shop, and Oakum Loft; in the Department of Steam Engineering: Pattern Shop, Machine Shop, Boiler Shop, and Coppersmith Shop; in the Department and Equipment and Recruiting: Sail Loft and Rigging Loft; and in the Ordnance Department: Gun-Carriage Shop.[28]

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[27] Vallette, History, 48-49.

[28] Vallette, History, 51-52.

The new shipbuilding technology required massive machinery to shape and roll the iron plate that formed ship hulls. The relatively cramped Federal Street location did not have space to erect rolling and fabricating shops for building iron ships. Its obsolescence could have led to the abandonment of the Philadelphia facility as a naval ship building and repair center.

The Navy Yard had completed one ironclad monitor and had another under way when the war ended, but it was not equipped to change over to metal-clad construction of larger ships. The need for navy yard facilities to specialize in iron shipbuilding had been seen by government officials before the war. The success of ironclads in battle made the issue even more pressing.

Local officials had been aware of this need and of the obsolescence of the Federal Street yard. Philadelphia political and commercial interests proposed a plan for a new yard that would guarantee sufficient space for mills and shops. The scheme involved an offer of several hundred acres to the government. In 1862, Philadelphia proposed to transfer League Island to the federal government for use as an "iron navy yard" at the nominal cost of one dollar. The city had spent $415,000 acquiring the land.

This shrewd move gave Philadelphia another advantage in the competition for a new yard. Secretary of the Navy Gideon Wells reported in December 1862:

> In March last, and again in June, I invited the attention of the Naval Committees of Congress to the importance of taking prompt preliminary measures for establishing a navy yard, including foundries, shops, and docks, adapted to the growing wants of the service and the country. It was not that we needed an additional navy yard, but that we required one of a different character, in many respects, from any that we possess . . . In selecting the site for such a navy yard there are two essential and controlling considerations that must govern. One is the very great advantage (if not absolute necessity) of fresh water over salt water for the preservation of iron vessels. The other is security of attack by a foreign enemy. These two primary qualities are to be had at League Island. Iron and coal are also in close proximity to that location.[29]

At the time, even the relative difficulty of navigating upriver some eighty miles to Philadelphia from the Atlantic was seen as an advantage, as unescorted enemy ships would inevitably ground themselves. The advent of steam power simplified ascending the river. Besides the advantages reported by Secretary Wells, the skilled labor pool and strong shipbuilding tradition on the Delaware could not be matched anywhere else in the country. Moreover,

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[29] "Reports of the Secretary of the Navy ... on the Proposed New Iron Navy Yard at League Island" (Philadelphia: Collins, Printer, 1863): 3-4.

Philadelphia's continued economic vitality and large population gave it a decided political importance. U.S. Senator J.W. Grimes of Pennsylvania made these points in a 1862 speech:

> Of course, the city expects to be, and ought to be, greatly benefitted by [the selection of League Island. ... All this is legitimate and proper. Other things being equal, the money of the Govemment should be expended so as to strengthen and benefit the largest numbers of citizens possible. But, while Philadelphia will thus be greatly aided in its prosperity, the advantage to the Government by this selection will be far greater than at any other place. When I consider the capacity of the site, its insular position, [fresh water, defensibility,] its proximity to a large mechanical population, commercial city, its proximity to the great coal and iron fields of Pennsylvania, and the economy of substituting this for the old yard, I have no hesitation in saying that I know of none, and I have heard of none, on this continent, that can fairly come in competition with it as the great iron navy yard of the United States.[30]

In the face of Philadelphia's offer, Congressional delegations from New England forced Secretary Wells to appoint a commission to consider at least two other sites for the "iron navy yard." These were New London, Connecticut, and Narragansett Bay, Rhode Island. The latter quickly dropped from contention, but New London was the choice of the commission's majority. The adamant minority choice of League Island received Secretary Wells's support, but the escalation of the war delayed any final decision.

In 1866, another flurry of pamphlets revitalized the dormant yard issue. The New London Navy Yard Committee understandably reissued the majority report from 1862 and restated its belief that League Island was unsound, both geologically and for human occupation. One of the pro-New London pamphlets estimated that League Island would cost $40,000,000 more to start and $770,000 more annually than a comparable yard in New London.[31] League Island continued to have the support of Secretary Wells, who reminded Congress that the late President Lincoln had twice mentioned his support of the site.

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[30] Quoted in "The New Naval Station at League Island," (s.l.: s.n., 1862): 20.

[31] "A Concise Statement of the Action of Congress in Relation to a Navy Yard for Iron Clad Vessels ..." (New London: New London Navy Yard Committee, 1866); see also "A Reply to ... 'Advantages of League Island for a Naval Station'" (New London: New London Navy Yard Committee, 1866), especially pages 15-20.

Philadelphia gained a more immediate advantage when ironclads retired from Civil War duty were placed in League Island's back channel. Corrosion was insignificant in its fresh water.[32] Finally, in December 1868, the United States Government took title to League Island. This action and the events leading up to it characterize the volatile mix of politics and economics that would shape the later history of the Philadelphia Navy Yard.

The Federal Street yard continued to operate until January 1876. Notably, the last two vessels started and completed there were wooden steam ships. The last launchings at Federal Street took place in 1875. QUINNEBAUG was "administratively rebuilt" from an older ship of the same name. In this manner, new vessels could be built without having to acquire an appropriation for new construction.[33] QUINNEBAUG was launched September 28, 1875 and towed up to the Neafie & Levy yard for fitting out as the Navy began to dismantle the Federal Street facility. ANTIETAM, begun in 1864, was almost scrapped on the ways. The authorities decided it would be cheaper to finish her. Her November 13, 1875 launching was the last to be held at the Federal Street yard. On December 2, 1875, the property was sold to a representative of the Pennsylvania Railroad for $1,000,000, but the successful efforts of Philadelphia's commercial and political leaders insured that the area would remain a naval shipbuilding and repair center well into the twentieth century.

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[32] "Advantages of League Island ..." (Philadelphia: Sherman & Co., Printers, 1866): 23-24.

[33] Egan, "Naval Shipbuilding," 9.

THE GENESIS OF LEAGUE ISLAND NAVAL SHIPYARD[34]

The period between the Mexican and the Civil War was distinguished by technological change. The Industrial Revolution was transforming the United States; new materials and machines opened opportunities for progress that would have been bewildering to the preceding generation. These advances in technology affected naval warfare. Although sailing warships lingered on for half a century more, the superiority of steam powered, iron warships was clearly established during the Mexican War. To be able to disregard the wind direction and force in a naval battle or advance up a river against current and tide gave commanders an obvious advantage over enemies using sail. The development of accurate long range artillery on a steam powered ship endangered coastal cities and made the defense of shore-based military installations difficult.

The original Philadelphia Navy Yard at Federal Street was obsolete and unable to adapt. Its machinery, layout and equipment were created for building and repairing wooden ships. The city had grown around the site ruling out any physical expansion. The new iron ships were built of formed and riveted bulkheads and shaped hull plating. There was no space to build the shops for cutting and forming the plate that formed ship components. A riveting shop was built but remained unused, and space for supporting machinery was unavailable.[35] If Philadelphia was to remain competitive in naval shipbuilding, a new site had to be developed. During the Civil War, on March 25, 1862, Secretary of the Navy Gideon Wells justified the rationale for government ownership of naval shipyards and strengthened the arguments for moving and expanding the Philadelphia facility:

> Iron ship-building is new in this country; but few persons are engaged in it, and it is a novelty in our yards. Heavy iron beams, shafting, and thick iron plates can be procured from only two or three parties, and then in limited quantities, and subject to great delay. Individuals have little use for iron of such magnitude as the navy must have, and there must unavoidably be great outlay for the execution of such work. With only the navy for a purchaser there can be no competition, and the government will be compelled under such circumstances, to pay almost any price the mills and forges may demand. No inconsiderable portions of an iron ship can be made and procured at the ordinary mills, and so far as it can be done, it may be the

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[34]In 1945 James Forrestal, Secretary of the Navy, established the Naval Shipyards as the industrial part of the "Navy Yards" which have construction and repair responsibility. The term "Navy Yard" was discontinued. All of the Naval Shipyards were placed under the "management control" of the Bureau of Ships in the Navy Department, Shipyard Commanders are responsible to the Bureau of Ships. A Naval Base was established at each of the old Navy Yards. The base handles all military affairs dealing with personnel, receiving stations, housing, etc. (Kauffman 1948:6).

In late 1945 the term Navy Yard was dropped from the Navy lexicon and the term Naval Shipyard was substituted. At each location where a Navy Yard had existed, a Naval Base was created. Those tenant commands previously included in the Navy Yard came under the Naval Base Commander and the Navy Yard was shrunk to include only those buildings and facilities dealing directly with the overhaul, repair, construction and fitting out of ships.

[35] Vallette, History, 8.

> best policy to be so supplied; but as the heavy and expansive portions cannot be so procured, and unless the government is prepared to execute the work, it will be subject to imposition, and its vessels to marked inferiority.[36]

As early as 1802, an alternative to the Federal Street site had been proposed but not seriously considered. This was League Island, located in the Delaware River about four miles due south of the city center of Philadelphia.

The island received its name because it is about three miles or one league in circumference. The island was originally granted to the Land Company of London and first surveyed in 1695 with the intention of building a fort for defense there.[37] The fort was not built and the land was farmed until 1835. Charles Wharton purchased it and the Pennsylvania Company took League Island over on a mortgage foreclosure in 1842.

It was not certain that the government would continue to maintain a navy yard in Philadelphia. Several cities competed vigorously for a new yard capable of producing iron ships. The contest narrowed to Philadelphia and New London, Connecticut. Proponents published broadsides and pamphlets extolling the virtues of their respective sites. The competition was intense as the factions maneuvered for an advantage. The Secretary of the Navy, Gideon Welles favored Philadelphia, while the majority report of the naval committee supported New London. A book written under the cryptic pseudonym, "A New England Man" detailed the arguments in favor of the League Island site. (See Appendix B)

Rear Admiral S. H. Stringham, Commodore William H. Gardiner, Commodore G. J. Van Brunt, and W.P.S. Sanger, Civil Engineer of the Bureau of Yards and Docks objected to the recommendations of the minority report. They continued to favor New London. Mostly, their objections were specious and trivial:

> All these objections amount to this: that nature has not made League Island a solid rock with vertical sides, in the deepest part of the channel, and a level surface at the proper height above the water for a navy yard. The statements against the character of the materials on the island on account of their not furnishing a proper foundation, are directly at variance with the report of the Coast Survey officer, who ascertained his facts from numerous borings, and not from his imagination.

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[36] "A New England Man." Advantages of League Island for a Naval Station, Dockyard, and Fresh Water Basin for Iron Ships, and Other Vessels of War, as Recommended by Public Authorities with All the Objections Heretofore Officially Advanced, Substantially or Textually Reproduced, and Severally Answered by a New England Man, (Philadelphia: Sherman & Co., Printers, 1866): 10.

[37] Captain Robert G. Mills "History of the Philadelphia Naval Shipyard," Pennsylvania Society of the Order of the Founders and Patriots of America, (5 October 1965): 6.

> The objections to the cost of wharfing and piling are simply objections to the making of any navy yard anywhere; for they apply equally to all locations.[38]

Philadelphia's civic leaders saw the benefits of an enlarged, modernized naval yard and quickly raised $415,000 to purchase League Island with the objective of donating it as a gift to the federal government. The availability of free land would make the Philadelphia site more attractive. In February 1863 the state legislature cleared the way for the city to turn over its property to the federal government. An act giving sovereignty to the Federal Government passed on February 10, 1863.

The site offered fresh water storage to minimize corrosion of the iron vessels that were making up the new navy. Dredging was easy and disposal of spoil would build up the elevation of the island. Secretary of the Navy Gideon Welles in an official report dated December 1862, noted the advantage of fresh water over salt and security from an attack by a foreign enemy as major considerations for the selection of Philadelphia's League Island.[39] Admiral Farragut's successful raid up the Mississippi and exploits in Mobile Bay during the Civil War revealed the major defense problems with a dockyard located close to the sea. Philadelphia also had coal, iron and timber readily available and a skilled labor force. The League Island site was selected and Philadelphia finally deeded the land over on December 12, 1868.

In September of 1871, Civil Engineer F.C. Prindle, USN was ordered to the new station to supervise layout and construction. At that time the island had 600 acres of dry land and 300 acres of marsh and wetlands. Repair and overhaul activities began in 1876. The official opening was January 7, 1876 when the old Yard was finally closed down and later sold to the Pennsylvania Railroad.[40]

1876-1914[41]

Philadelphia retained a Navy Yard, but League Island was developed slowly and not a single vessel was actually built there until 1915. This inactivity mirrors that of the United States Navy during much of this period, but League Island itself posed problems. The 1860s vision of Philadelphia growing south to the island did not materialize. Instead, South Broad Street crossed several miles of marshy, unsettled land to deliver Yard workers from the city. A railroad spur from the Pennsylvania Railroad only reached League Island in 1899. Docking facilities were not much better, with only a single pier constructed before the 1890s. There was an initial spurt of building based on an 1872 board of civil engineer's plan. Some facilities were relocated from the Federal Street site. Yet, all development activity at League Island stopped in 1880. The site was threatened by closure. This was averted, but not without the usual political and editorial

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[38]"New England Man," Advantages, 67.

[39]Silverman, 1.

[40] Kauffman, Philadelphia's Navy Yards, 3.

[41] This and subsequent sections are derived largely from A.R. Ritter, "A Brief History of the Philadelphia Navy Yard from its Inception to December 31, 1920" (typescript, 1921).

maneuvering (see Appendix A). Up to 1889, only $1,700,000 had been invested in the physical plant. An October 1889 board of naval officers plan for League Island marks the true beginning of the modern yard.[42] The board's report repeats much of the 1860s language, concluding, "The fact of this station being near the coal and iron mines, and in the neighborhood of so many works of different kinds connected with ship building and supplies, is seen in a much stronger light now than when attention was first called to it."

Congressional support was building during the 1880s and 1890s for the creation and support of a large and modern Navy. Roach, Cramp, and other local yards dominated naval shipbuilding in this period. The Delaware River was established as the leading shipbuilding center in the nation.[43] The Navy presumably wished to develop its own local facilities to complement those of the private shipyards and to provide for the repair and maintenance of its expanding fleet.

The 1889 plan included a reserve basin to be shaped out of the back channel west of Broad Street. A building and repair basin was planned south of the reserve basin. A series of drydocks and shipways were designed between this basin and the river. Specialized fabrication shops would be built around these larger features.[44]

This basic plan determined the current configuration of the Yard's major elements, with the reserve basin and shipbuilding facilities contained west of Broad Street. The total estimated cost for the work proposed was $14,565,480. Only $575,000 of this was appropriated before 1895. Nevertheless, drydock No. 1 (timber drydock) was completed in 1891. Sea walls defined the basic shape of the river frontage by 1895. Much of the fill used to create the Yard came from the reserve basin and drydock excavations. Additional material was also brought downriver from the removal of Smith and Windmill Islands in 1894.[45]

Other particulars of the plan were implemented before 1915, notably as a result of the Spanish American War. Many permanent buildings were constructed ca. 1900-05 and a second drydock completed in 1910. The Yard continued to function solely as a maintenance and repair facility.

The organization of the Yard remained largely as it had been at the old Federal Street Yard. In February of 1909, all industrial activities were grouped into a Manufacturing Department in an attempt to eliminate duplication and competition between departments. Similarly, other yard work was organized by function rather than materials or skills. In November

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[42] Report summarized in Frank H. Taylor, The Hand Book of the Lower Delaware River (Philadelphia: Geo. S. Harris & Sons, Printers, for the Philadelphia Maritime Exchange, 1895): 77-81.

[43] Egan, "Naval Shipbuilding," 10.

[44] See plan in Taylor, Hand Book, 78, and cross section drawing tipped into Vallette, History (inside back cover).

[45] Smith, Philadelphia on the River, 85-86, 140.

1909, Yard departments included: Manufacturing (with Machinery and Hull Divisions), Yards and Docks (after April 1911, Public Works), Inspection, and Accounting. The Commandant was now the sole Yard official to report directly to Washington, D.C., further simplifying the overall bureaucracy.[46] These changes anticipated modern organization and the emergence of service and technology oriented (rather than manufacturing) divisions, such as the 1910 establishment of the Naval Boiler and Engine Laboratory at the Yard.

The Yard employed roughly two thousand workers in the ca. 1900-15 period. One of the larger projects in that period was the fitting out of the 16,000-ton battleship KANSAS. The New York Shipbuilding Corporation in Camden launched her in 1905. KANSAS was commissioned at League Island in April 1907 and later that year served as the site for a public dance at the Yard. A newspaper account of the event began:

> With dancing on the battleships as the attraction yesterday, upward of 40,000 persons, young and old, visited League Island Navy Yard. It was the largest Sunday crowd in the navy yard in many years. Ministers of the city protested several weeks ago against football playing by the sailors in League Island Navy Yard . . . There was little football playing there yesterday, being merely a little practice playing, and the dance was the feature of the day. So great was the jam on the battleship Kansas, where the main dance of the afternoon was held, that at times it was impossible to ascend the gangplank and get within sight of the dancing floor, on the port side of the main deck.

Battleships MAINE and GEORGIA, in the Yard for overhauls at the time, were also part of the festivities. The sailors attached to the vessels being overhauled added to the enlisted population at the Navy Yard and their forays into the city were a potent reminder of the Navy's continued presence. Periodic public openings and ceremonies opened the Yard to the city at large. But the availability of public transportation to the yard was marginal until the 1920s.

This isolation was not without advantages: League Island continued to grow through dredge and fill programs. Security was effective from the land side. The problem of transporting employees to the site remained largely unchanged since the 1860s:

> The extension of the horse railroads to League Island, or the use of the steam-tug as now, will render it easy to live in the city and work at the yard . . . The ferry, which formally connected League Island with Red Bank [New Jersey], being reestablished, there are admirable sites for dwellings within less than a mile of the navy yard . . . There are good sites on the island itself, with trees of already large growth near them.[47]

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[46] Ritter, "Brief History," 7-11. Philadelphia Maritime Museum Library has several Yard boat shop muster books from this period, 85.9.1-2,.4 and a 1906 apprentice certificate, 85.9.6.

[47] "Reports of the Secretary of the Navy and the Commission by Him Appointed, on the Proposed New Iron Navy Yard at League Island" (Philadelphia: Collins, Printer, 1863): 42.

Private ferry service from the city and Red Bank augmented private carriage service on Broad Street throughout this period. The Yard itself had an intemal trolley system after 1901, but the Philadelphia Rapid Transit Corporation trolley system did not reach League Island until 1920.[48] Although it wasn't easy to get to the yard, these connections with the city and its suburbs were sufficient enough to minimize development of civilian housing on or immediately adjacent to the island.

The emerging petroleum refinery district along the Schuylkill and the existence of two at-grade railway lines across South Philadelphia inhibited any development near League Island. This situation was addressed during the progressive administration of Mayor Blankenburg. A 1913 report details the agreement between the city and the Baltimore & Ohio and Pennsylvania Railroads. At-grade lines were abandoned and a "belt line" railroad created. The new line would skirt the northem edge of League Island and open up some 4,000 acres below Oregon Avenue for residential and industrial development. The belt line was to link the Schuylkill and Delaware River waterfronts, with two large terminals to be developed on the latter just above League Island. Finally, the plan created a large park along South Broad Street with a "monumental" 300' wide bridge over the railroad to connect Broad Street to the Navy Yard proper.[49]

The plan had something for everyone and finally integrated League Island into the city. The belt line was ultimately realized in the form of Interstate Route 95 which constitutes the existing northem boundary of the Naval Base. The park emerged initially as the site of the 1926 Sesquicentennial and was further developed in the 1930s.[50] Thus the 1913 plan created the Yard's modern context much as the 1889 commission report had determined its internal arrangement.

1915-1920

The increased activity brought about by World War I finally brought League Island to maturity as a navy yard. In June 1914, just before the War broke out, $200,000 had been appropriated for the construction of a shipbuilding slip way. By June 1915, the keel for a transport ship had been laid. The 11,250 ton HENDERSON was the first vessel completed by the Yard in 42 years. It was launched in 1917. The Yard still did not have the ability to construct the larger capital ships then favored for naval warfare.

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[48] Ritter, "Brief History," 86-87. The Red Bank ferry remains in operation to this day, see "Commuting by Boat," Philadelphia Inquirer Magazine, 22 July 1962.

[49] "South Philadelphia: The Abolishment of Grade Crossings and the Creation of Opportunities for Commercial and Industrial Development" (Philadelphia: Department of Public Works, 1913). Report also documents that "piggeries" were a primary ca. 1913 use of land; New London supporters had derisively noted this in the 1860s.

[50] Until it was demolished in 1992, the municipal stadium created for the Sesquicentennial hosted the annual Army-Navy football game which has since been moved to Veterans Stadium. The game has always been a high point of naval activity and visibility at the Base and in Philadelphia.

This situation changed in 1917, when the General Board of the Navy stated that the Philadelphia Navy Yard was "to be developed as [a] base for ships in reserve and [an] Advanced Base School. The Navy Yard was to be developed as a ship repair yard and the primary shipbuilding yard." To this end, massive investment was made in shipbuilding facilities, including one of the Navy's largest drydocks. Drydock No. 3 was built to accept a ship 984' long and was completed in 1921. Two building slips with overhead crane systems were also built.

Additional piers were built on the Delaware. Pier 4 received a hammerhead crane capable of lifting 350 tons. For several years this was the largest such crane in the world (Figure 6). Twenty-one miles of railways connected the various facilities on the base. Barracks for 7,000 workers and a 200-bed emergency hospital were among many temporary support facilities developed at the time. Yard employment went from an average of 2,500 in 1916 to a peak of 12,000 in April 1919. A. R. Ritter sums up the frenetic development effort by noting that twice as much money was expended in developing the yard ca. 1916-20 than during the entire ca. 1868-1915 period. By 1921, the Yard's physical property was evaluated at close to $55,000,000, with half the amount representing land and buildings.[51]

One important addition during this expansion was the Naval Aircraft Factory (NAF), established in 1917. This facility carried out development and research in aviation with particular reference to naval applications and occupied 47 previously undeveloped acres at the eastern end of the island. The availability of this Government-owned land was the immediate factor. "The favorable material market and large available supply of labor appeared to give promise of prompt completion of the factory and plants and of rapid production of aircraft." This proved true on both counts; the 400' x 400' factory and the 1,100' x 400' assembly plant produced close to a thousand planes by 1919. A total of over $5,000,000 was invested in the NAF before 1921.[52]

The Yard completed several vessels during and immediately after the War, including four minesweepers and the 9,800 ton hospital ship RELIEF. Still, the bulk of naval shipbuilding in this period was again done by the private yards. Cramp's and New York Shipbuilding were involved in a massive destroyer building program. Wooden subchasers and other smaller vessels spread naval work to other Delaware Valley yards, such as Mathis-Trumpy in Camden. In naval shipbuilding alone, private yards worked on 106 vessels with a total of 306,000 tons, while the Yard started eight with a total of 111,500 tons.[53]

The Government was also actively involved in merchant shipbuilding in this period, through the American International Shipbuilding Corporation at Hog Island. This impressive effort employed over 30,000 workers at its peak and was located on the Delaware just south of

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[51] Ritter, "Brief History," 5-6, 113-114.

[52] Ritter, "Brief History," 128-134.

[53] Egan, "Naval Shipbuilding," 13-17. The respective proportions of private and public work correspond to overall national pattern H. Gerrish Smith and L.C. Brown, "Shipyard Statistics," in Fassett, F.G., Jr., ed., The Shipbuilding Business in the United States of America (New York: The Society of Naval Architects and Engineers, 1948), plate 4.

the Navy Yard across the mouth of the Schuylkill. Naval shipbuilding was a cooperative effort involving government owned facilities as well as many of the private yards along the Delaware.

1920-1939

The Yard had commenced construction of two 43,500 ton battle cruisers in 1920. These were dismantled on the shipways to satisfy the 1922-23 disarmament treaty. Scrapping of warships would be the major activity of the Yard in this period. Commander H. E. Rossell gave an interesting talk on this subject in November 1924, based on "the experience of the Philadelphia Navy Yard in making five battleships unsuitable for warlike purposes and in cutting up for scrap two partially completed battle cruisers on the building ways, and five completed battleships afloat."[54] The latter were later allowed to be modernized by treaty amendment; this work was carried out ca. 1925-33. Egan notes, "In many respects, these conversions approximated the effort and cost required in their original construction."

The Yard also constructed several genuinely new vessels, largely financed by the National Industrial Recovery Act of 1933. These included the 9,950 ton heavy cruiser MINNEAPOLIS, the 10,000 ton cruisers PHILADELPHIA and WICHITA, four 1,500 ton destroyers, and several smaller vessels. Private yards built just over half of the 237,000 tons completed in the period.[55]

Employment at the Yard decreased dramatically from wartime levels around 1920-21, but remained stable after that at roughly 5,000. This personnel level was significantly out of proportion with the Yard's recent expansion of capital plant; the specter of closure was once again raised. A 1926 Yard "guide and directory" published for Sesquicentennial visitors provides an excellent overview of the Yard at that time and of its self-promotion. On a page entitled "What the Navy Yard Means to the City of Philadelphia," the number of civilian employees is listed as 5,144 with a total yearly payroll of $9,300,000; enlisted personnel pulled in another $1,100,000. Close to $7,000,000 was expended "in the vicinity" for Yard materials and supplies in the 1924 fiscal year. The obvious conclusion aimed to generate local political support: "The Philadelphia Navy Yard is a financial asset in time of peace and war." Another passage is even more explicit:

> Although the plant at this yard as developed during the recent war is entirely too large for economical operation under present conditions from an industrial standpoint, it nevertheless fulfills its mission as a navy yard when considered from a military standpoint, that of sudden expansion in an emergency. The yard has also demonstrated its capacity as a reserve station.

This promotional effort was forwarded by the Committee of Employees to Advocate the Development of the Philadelphia Navy Yard which "at all times kept alive before civic bodies and the naval authorities the great advantages of the yard." Also prominent in the guide are the

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[54] Printed as "Scrapping Warships" in Transactions of the Society of Naval Architects and Marine Engineers XXXII (1924): 149-162, plates 75-83.

[55] Egan, "Naval Shipbuilding," 17-18.

members of the Master Mechanics Association (established in 1910), who also functioned as Yard "ambassadors" to the community and de facto heads of the entire workforce.[56]

The development of specializations in this period would help the Yard survive future hard times. On the industrial side, the Yard's foundry became the sole USN supplier of large, cast propellers. The boiler and turbine shops were also noted for their expertise and quality productions. In 1937, Industrial Manager Captain A. H. Van Keuren could boast, "In short, the Yard can undertake repairs to the largest guns or the smallest watches; it can make a turbine for the main propelling machinery of a battleship or rewind the small motor of a ventilation fan; it can design and build a large ship or make one of the smallest boats that it carries."[57] Kauffman notes of this period:

> Retrenchment became the rule, and the depleted working force was largely concentrated upon routine upkeep and the lessons of the War as involving material. Elaborate tests were made on the machinery of surrendered German submarines; much valuable information was obtained. The Aircraft Factory meanwhile conducted intensive research in its quest for better planes, on the experience gained from the War.

In accord with this expanded role in research and development, the eastern half of the back channel was filled in during 1925-26 to create a larger airfield, Mustin Field. This new role as research center is represented by the efforts of the Naval Boiler and Turbine Laboratory: "Its mission has been expanded to provide facilities and trained personnel for full-test and improvements of naval boilers, turbines, gears, engines, and other propulsion equipment [and their fuels]." The Yard's technicians had also done early experiments with radio-controls, equipping the old battleship IOWA so she could be used for experiments and target practice.[58]

The development of a larger naval service/industrial complex in the Delaware Valley also occurred in this period, largely through ca. 1930s Works Progress Administration projects. These facilities were managed by the Yard commandant, who also served as head of the Fourth Naval

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[56] "Your Navy" (Philadelphia Navy Yard, 1926): 17, 25, passim.

[57] Navy Day program, 27 October 1937, unpaginated; photographs throughout this publication illustrate the Captain's point.

[58] The Iowa was converted to burning oil to make automatic control possible. Her name was changed to Coast Battleship No. 4. Starting, stopping, steering and engine speed could be controlled with a radio control system designed by John Hays Hammond Jr. If the controlling signals faded or were lost, the system automatically shut down. The first test was in June of 1921 about 100 miles off the Virginia Capes. Four "NC" flying boats, 12 "F-5-L" and 4 Martin Bombers dropped dummy bombs on targets painted on the battleship's deck.

In March 1923 the first radio controlled battleship was deliberately sunk by 14 inch shellfire during maneuvers at Panama Bay. Alice Brannigan "America's Robot Battleships," Popular Communications, (September 1994): 12-19.

District. The Naval Home continued to operate at Gray's Ferry. The temporary hospital at League Island was replaced by a 13-story, 650-bed hospital completed in 1935 on nearby Pattison Avenue. The Marine Corps maintained supply depots at Broad and Washington and on the Schuylkill at Locust Street. The Fourth District helped supervise the enormous Defense Personnel Supply Depot built in South Philadelphia. By 1943, this facility alone covered eleven square blocks and employed over 5,000 civilians. Fort Mifflin was improved to serve as a Naval Ammunition Depot. Naval air stations were established at Willow Grove and at Atlantic City, Cape May, and several other New Jersey sites. In Northeast Philadelphia, a large Naval Aviation Supply Depot was constructed on Tabor Avenue. A Naval Modification Center (for aircraft) was established in nearby Johnsville. These facilities increased the Navy's economic and political role in the Delaware Valley.[59]

1939-1948

> The third Navy Day to be celebrated since the outbreak of World War II looks upon an ever-darkening world horizon and finds the country in the midst of the greatest naval construction program in history. Its purpose is to produce a two-ocean navy, the largest and most powerful in the world.
>
> The Navy has cause for pride today, the Philadelphia Navy Yard in particular. For today the Yard is coming into its own. It is building fighting ships and planes, the weapons of war which will forge an impenetrable cordon of steel around these United States of ours. Now at last the Yard is given the opportunity to fulfill the purpose for which it was intended, when changed from a fleet base to a "building yard."[60]

This October 1941 statement captures the wartime mood at the Yard. During the War, over $100,000,000 was invested at the Yard, and employment went from 5,500 to a wartime peak of 47,000 in 1942, with over 20,000 in the Industrial Division alone. The effort was unparalleled in the Yard's experience: "Essentially, the problem was building ships and building the facilities for building ships, at the same time." The enormity of the problem and the ingenuity used in solving it are illustrated by the report that at one time six destroyer escorts were being constructed in drydock number 4 while the dock itself was still under construction. The drydock had to be rushed to completion to launch the vessels.[61]

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[59] See "History of the Public Works Department" (typescript, 1941) and "The War History of the Public Works Division, Philadelphia Naval Base, Dec. 1941 [--] Aug. 1945" (typescript, 1945).

[60] Navy Day program, October 1941, unpaginated.

[61] Kauffman, Philadelphia's Naval Yards, 25.

By 1945, 53 ships with a total displacement of over 280,000 tons had been completed at the Yard. 1218 other vessels had been overhauled, converted, or fitted out.[62] Most prominent of these were the battleships WASHINGTON, NEW JERSEY, and WISCONSIN; the aircraft carriers ANTIETAM, VALLEY FORGE, and PRINCETON; the cruisers LOS ANGELES and CHICAGO; and the large minelayer TERROR.

The Naval Aircraft Factory was incorporated in the Naval Aircraft Material Center in 1943; this facility's wartime production included over 1,400 aircraft and 150 flying boats. By 1946, the Yard had the most complete naval drydock complex in the nation served by over 50 miles of railways. It was estimated to be worth over $250,000,000.

The private yards again contributed mightily, with New York Shipbuilding alone building nearly as much tonnage as the Navy Yard. The Cramp yard was reopened specifically for the war effort in October 1940. Every other private yard also participated. By 1947, 195 naval vessels with a total displacement of over 1,500,000 tons had been constructed in the Delaware Valley.[63]

Naval and other defense-related supply and service facilities also expanded during the war, most notably at the various Naval Air Stations and the Naval Aviation Supply Depot in Northeast Philadelphia. Navy receiving barracks and other Government-financed expansions were made at both the New York Ship and Cramp yards.[64] At the peak of activity, there were 785 officers directing these region-wide facilities. The October 1944 directory of officers for the Fourth Naval District has over 60 pages and lists many of the commands created.

Praise was lavished on Yard employees for their wartime efforts, no doubt in part to compensate for the longer hours and heightened pace of work. The prose on the invitation to the August 20, 1944 launching and christening ceremonies for the carrier ANTIETAM and cruisers LOS ANGELES and CHICAGO is typical:

> THE NAVY YARD worker in your family has helped to accomplish the greatest feat in shipbuilding history! ... You are invited to witness what has been done by him and his fellow workers, because it is hard to imagine the magnitude of this majestic achievement without having seen actual proof. These men and women workers, in the throes of war-time maximum production serving as a lifeline to the battlefronts of the world, have performed a heretofore unequaled task. The Navy is proud of the Yard worker in your family and wishes you to share the honors with him on the day of the Christening.[65]

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[62] See "Request 187" memo and photographs, 83.46.223-407 and TAYLOR and BLAKELEY memo and photographs, 83.46.737-765 for well-documented projects of this sort.

[63] Egan, "Naval Shipbuilding," 18-23. This figure does not include ships only partially completed, like the battleship ILLINOIS which was discontinued at the Yard.

[64] "The War History of the Public Works Division," passim.

[65] [Philadelphia Maritime Museum Library, mss. collection]

The mention of "women workers" is noteworthy; the war provided an opportunity for women to break into the ranks at the Yard. A review of the photographs and stories in the Navy Yard Newspaper of the period shows women working as riveters and welders on PBY bombers. Some of the twenty-six foot whaleboats were built by all-women work crews. Women worked as tackers and welders on ships. They also worked in the materials test laboratories. There were thirty-two women blacksmiths operating steam powered hammers for forging chisels and other tools. Women had jobs driving tractors and as "chaufferettes" driving other vehicles around the yard. A few women worked as crane operators and as machinist's helpers.

Similarly, photographs document that a significant percentage of the labor force was black.[66] The ranks of officers and members of groups such as the Master Mechanics Association remained the bastion of white males until the post-war period. The establishment in 1941 of a Yard newspaper, the Beacon, helped to develop cohesion among the thousands of employees. The paper had a column by, for and about women starting on July 30, 1943.

The Yard did not lack for patriotism, being the first in the nation to earn the Secretary of the Navy's "Bond Flag." This signified that at least ninety percent of the civilian employees were voluntarily enrolled in a war bond purchase program. Similarly, the Yard received several Navy "E" burgees for general industrial excellence. The Yard had indeed come into its own and directly affected the lives of more Philadelphians than ever before.

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[66] (cf. photographs 83.46.1-790).

THE POST-WWII PHILADELPHIA NAVAL SHIPYARD

1948-1970

Since November 1945, the Philadelphia Naval Shipyard has been administered by the Bureau of Ships of the Navy Department, while forming the major component of the United States Naval Base, Philadelphia. The other major components under the supervision of the Base Commandant include the Naval Air Engineering Center (NAEC, successor to NAMC) and the Naval Ship Systems Engineering Station (NAVSSES, successor of Naval Boiler and Turbine Laboratory/Naval Ship Engineering Center). The post-WWII history of the PNSY, after an initial flurry of disarmament and scrapping work, has been marked by little new construction and sporadic conversion and overhaul work. NAEC was reorganized in the 1960s and some of its components relocated to other Fourth Naval District sites, notably the Johnsville Naval Air Development Center. The importance of NAEC and NSEC/NAVSSES in the context of the Base has increased over time and especially since 1970.

This trend towards specialized training and service over shipbuilding was reinforced with the founding in 1944 of the Naval Damage Control Training Center and in 1948 of the Material Preservation School, later absorbed by Inactive Ships Maintenance. The latter department has been in charge of the Philadelphia group of the Atlantic Reserve Fleet. This is the "mothball" or "zipper" fleet stored in the reserve basin. Significantly, ship inactivation and storage have been among the most consistent activities at the PNSY since WWII.[67]

At its lowest point in the post-war retrenchment, the PNSY employed only 6,800 in the spring of 1950, but most of the large industrial infrastructure remained. Even before the wartime buildup, the Yard was the largest integrated industrial site in the Delaware Valley. The three large shipways were demolished when it was decided to perform new construction and conversions in the drydocks.[68] The organization of PNSY industrial personnel remained intact, with nineteen separate shops described in a 1951 guide. Many of these were directly descended from those first established at the Federal Street yard: Sheet Metal, Forge, Pipe and Copper, Joiners, and Patternmakers among them. The largest shops were the Inside and Outside Machine Shops. The former included the propeller facility, still a PNSY specialty; the latter alone employed 802 workers. The Electronics Shop installed many of the advanced systems devised and refined by its Base neighbor, the Naval Ship Engineering Center. The Boat Shop continued to specialize in wooden vessels of the 10' to 80' range, but completed the yard's first post-war vessel, an experimental all-welded aluminum PT boat in 1951.[69]

The Yard still retained the facilities and expertise to build large vessels, but little naval construction was undertaken in the 1950s. Significant conversion programs and the Korean War

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[67] Armed Forces Day program, 20 May 1950, provides a concise overview of the PNSY and USNB at the height of retrenchment and is the first to "feature" the "mothball" fleet among Yard activities.

[68] Egan, "Naval Shipbuilding," 25.

[69] 150th Anniversary Celebration program, July 1951, passim.

boosted employment to over 13,000 in April 1951, but the level quickly receded to an average of 10,000. As in previous low periods, the PNSY and the USNB as a whole stood behind their long history and emphasized the more dynamic components of their operations. The 150th anniversary of the Yard's founding in 1951 provided a perfect opportunity for some self-promotion. Admiral Forrest Sherman, Chief of Naval Operations, struck the note that the Yard's backers wanted to hear:

> For one hundred and fifty years, the Philadelphia Naval Shipyard has been building, converting, repairing and maintaining ships for the United States Navy. At the same time, the Shipyard has built for itself a reputation for inventiveness, quality workmanship and a "can do" spirit of which all hands, military and civilian, may well be proud.[70]

Rear Admiral W. McL. Hague noted PNSY's excellent safety, training, and progress in "teamwork" and the "beneficial suggestions field." Departing Fourth Naval District Commandant Rear Admiral R.E. Schuirmann underlined the Yard's dedication to quality: "Pride of craftsmanship has been handed down from one generation to the next, and the personnel of today continues to uphold the high reputation that the Philadelphia Naval Shipyard has always enjoyed for its ability to undertake any job, and to do it well." Secretary of the Army Frank Pace, Jr. adds just a hint of caution, "I congratulate you on your sesquicentennial which marks a record almost as old as our Nation. May you continue to add to that record in the uncertain years which lie ahead."

The Philadelphia Naval Shipyard Development Association, an employee group initially founded after WWI, sought to assure the future of the Yard and the jobs it provided. In 1951, its mission was "the development of [PNSY] as an efficient tool of Government for the production of effective defensive units for our fleet and as a better place in which Philadelphians and their neighbors may work together for the defense of the nation." The realities of the postwar situation were explicit:

> Just as private concerns are in competition in the sale of their products, we of the Shipyard are in competition with other Shipyards in procuring work to keep in business and justify our existence. Of course, our efficiency in production and excellence of work are our best selling points. But again making comparison with a private enterprise, just as every going concern in order to 'keep going,' repeatedly brings to the public an awareness of the value of the product it offers, so must we of the Shipyard make known the potential value to the nation of the capabilities of the Yard as a whole of the unique technical abilities of specialized groups as a means of attracting to the Yard a continuing flow of work. Salesmanship as exhibited by the Development Association has been instrumental in procuring through legitimate development of good will our reasonable share of steady work for our employees.[71]

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[70] This and following testimonials from 150th Anniversary program, passim.

[71] 150th Anniversary program, 24-25, 76.

The Development Association maintained ties with the city and "Naval Establishment" for the Yard and encouraged the use of "teamwork" and other personnel management techniques. Even in peacetime, the Navy was a substantial contributor to the local economy. In 1952 alone, $1 billion was spent on naval activities in the Delaware Valley: half going to local suppliers, $200,000,000 to military and civilian employees, and the balance to facility improvements.[72] The effort to position the PNSY as a modern, adaptable facility and to assure its share of naval spending would continue as large contracts became fewer, especially after 1970.

These development efforts were necessary: the Yard was threatened with closure in 1964. The new Johnson administration was intent on cutting military spending. The PNSY along with the Boston and Mare Island Yards were on the list of proposed closures. The Philadelphia Inquirer documented the tenuous state of shipbuilding on the Delaware at the time, both at the PNSY and the private yards. Its suggested strategy of admitting the need for cuts, but not in Philadelphia, characterizes the postwar naval shipbuilding mentality (see Appendix A). The list of the Yard's advantages reiterates an argument right out of the 1860s; "The Philadelphia Base is the best in the nation for the storage of [mothballed] ships because it is on fresh water, and the ships being stored are not subjected to the corrosion of salt water."[73]

The Navy had certainly changed its mind by 1967. PNSY was selected along with Long Beach as the site of "pilot activities" meant to modernize the Navy's shipbuilding programs. $80,000,000 was to be expended between 1970 and 1975 on these modernizations and to stabilize employment levels. Montgomery County Congressman Richard Schweiker, a member of the House Armed Services Committee, greeted this news with enthusiasm; "Naval officials have now placed a top priority designation on the Philadelphia facilities. I interpret the Navy's plans to indicate that Philadelphia will be used for construction work as well as conversion, alteration and repair since the Defense Department will want to maintain some construction capability within the public sector."[74]

Instead 1970 marked the date when the last ship built from the keel up was completed and launched by the PNSY. Conversions and repairs represented a majority of the Yard's work, with projects such as the Vietnam-era reactivation of the battleship NEW JERSEY typical. The NEW JERSEY was originally built at the Yard between 1940 and 1943. After PT812 was completed in 1951, the Yard was out of new construction until 1958, when the 5,800-ton guided missile frigates DAHLGREN and WM. V. PRATT were started. From that point until 1970, at least one new vessel was always under construction: four 18,000-ton helicopter assault ships, three landing ships, and a 19,000-ton specially-designed amphibious command ship. The latter vessel, the BLUE RIDGE, was the last built from the keel up at the Yard.

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[72] "Government Is Spending Millions," Philadelphia Inquirer, (13 October 1952), section on "The Port of the Delaware Valley."

[73] Donald McLean, "Philadelphia Shipyards Await the Big Decision," Philadelphia Bulletin (21 January 1964).

[74] Quoted in Jerome Cahill, "U.S. Plans to Spend $80 Million Here on Naval Shipyard," Philadelphia Inquirer, (25 March 1967).

Private naval shipbuilding on the Delaware also ended about this time. New York Shipbuilding launched more vessels and tonnage than the Yard, including the 80,800-ton carrier KITTY HAWK, the largest ship ever built on the river. The KITTY HAWK and other vessels were completed at the PNSY. New York Shipbuilding closed in 1969 due to the scarcity of new contracts and management problems. Sun Shipbuilding in Chester remained as the only major private yard still in operation until it too, closed in the early 1980s.[75]

1971-1992

The PNSY, as a part of the national defense system, remained open, but it was effectively out of the new shipbuilding business. The Yard and Base remained an important local employer, however, with close to 12,000 civilian employees and over 3,000 enlisted personnel in 1971. For comparison, the totals for the entire Fourth Naval District in that year were 26,000 and 8,000. By 1991, the district total had decreased to just over 20,000 combined, indicating the steady decline in federal naval spending. Steady overhaul work has been the main Yard activity, but it has not functioned anywhere near capacity.

The competition for naval contracts became intense. A 1980 controversy over PNSY work on the amphibious attack ship GUAM illustrates this. Virginia Representative G. William Whitehurst wrote to the Navy insinuating that the work was faulty, the purpose being to guide future contracts to the Newport News Shipyard & Drydock Co. located in his district. The Navy responded that while problems with the GUAM had been "greater than normal," the PNSY had done a "reasonable job." Pennsylvania Senator John Heinz summarized the situation, "I believe that this effort to discredit the shipyard is less a constructive criticism than another unsuccessful effort by the Virginia delegation to undermine our port for its own regional gain."[76]

Since 1980, the PNSY has been the lead Yard for the Navy's Service Life Extension Program (SLEP). Five aircraft carriers have been overhauled to date, at a cost of over $3 billion. The INDEPENDENCE alone cost $620,000,000. The work is extensive; the enormous carriers are placed in drydocks and stripped down to the bare metal. They are gutted of their massive engines, shafts propellers and arresting gear equipment. The catapults that launch their airplanes are realigned and improved. Their electronics and self-defense systems also are upgraded to modern standards. Finally, the entire ship is pieced together again. It is an undertaking second only to the space program in its complexity, shipyard officials say.

SLEP has not been controversy-free. There were problems in 1983 with SARATOGA, the first vessel overhauled. Secretary of the Navy John Lehman demanded improvements in the quality of work on the next carrier. The Yard responded and the FORRESTAL passed all performance tests. In 1985, Lehman noted "superb improvements in productivity" as part of the

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[75] Egan, "Naval Shipbuilding," 25-26.

[76] Quoted in Robert R. Frump, "Navy official says Philadelphia. shipyard did 'reasonable job' on the Guam," Philadelphia Inquirer, (3 January 1981).

reason the PNSY was removed from a new list of 21 sites considered for closure.[77] The PNSY has also participated in the New Threat Update program to enhance the combat systems of older vessels, and continues to operate the Navy's only propeller manufacturing facility. As the CONSTELLATION prepared to leave the Yard in 1993, there were renewed threats of closure and no new major overhaul programs were firmly planned. The Yard's final SLEP overhaul is underway on the carrier JOHN F. KENNEDY. It is expected to be completed in mid-September of 1995.

The physical nature of the Yard has changed little since 1970. On-base housing and facilities for officers and enlisted personnel have expanded dramatically in the last two decades. Mustin Field no longer supports airplane traffic; its runways are now the main access roads to several clusters of 1960s barracks and ca. 1970 brick townhouses "in traditional Philadelphia row house style." There is a large 1970s development of townhouses at the extreme eastern end of the island. A 36-space mobile home park provides sites for military personnel. A former airplane hangar at one end of the main runway now houses the base commissary, while the other end is blocked by a McDonald's restaurant.

This residential complex accommodates a significant percentage of the Base's enlisted personnel as well as the complements of the ships being overhauled at the Yard. As a 1991 guide described it, "Today, Naval Base Philadelphia is a small city of 52 miles of streets, four miles of waterfront, stores, recreation facilities and office buildings with an assessed real estate value of nearly $2.5 billion."[78]

CONCLUSION

Naval Base Philadelphia and the Philadelphia Naval Shipyard have been important elements in the economy and life of the Delaware Valley since 1801. The government's decision to close a major part of the facility represents a significant cultural change for the area. Some workers with skills unique to ship repair or construction will need to relocate or develop new abilities. A shop-based subculture based on apprenticeship and a father-to-son work lineage will decline.

Closure also offers an opportunity for Philadelphia, which will once again own much of League Island, to reindustrialize with the technologies that will lead the nation into the twenty-first century. The workers of South Philadelphia, whose superb skills have made a vital contribution to the dominance of American sea-power, will be essential to that effort.

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[77] "The Philadelphia Naval Shipyard" Philadelphia Inquirer Magazine, (22 February 1987).

[78] "Welcome Aboard the Navy in Philadelphia" (San Diego: Blake Publishing Company, 1991); see also "The Delaware Valley Salutes the Philadelphia Naval Base" (Boone Publications, c. 1971) for housing information. Also note the suggestion in these guides that enlisted personnel living off-base select/prefer New Jersey over Philadelphia and its Pennsylvania suburbs.

APPENDIX A
HISTORICAL COMMENTS ON CLOSURE OF THE PHILADELPHIA NAVAL SHIPYARD

The Philadelphia Naval Shipyard (PNSY) and the United States Naval Base (USNB) to which it is attached have been under the political gun with the military downsizing and budget cutting of recent years, threatening the jobs of thousands of enlisted and civilian personnel in the Delaware Valley.[79] An entire way of life centered around work and duty at the PNSY is at stake, one that has been unbroken since the first yard opened in 1801. The foregoing quotes -- dating respectively to 1801, 1884, 1964, and 1987-- document the interplay of local interests and national policy that has shaped the shipyard and base as they exist today. The naval industrial complex in the Delaware Valley has grown and contracted along with the United States Navy (USN) itself.

1801: *"Resolved,* That the remote, partial and doubtful benefits which might be derived from the opening of Swanson street, or any other street which interferes with the site proposed for the Navy Yard, are not to be placed in competition with the immediate, general and certain benefits of an establishment which would give encouragement and employment to almost every class of mechanics and laborers; would increase the circulation of industry and money in the district, as well as its progress in population and improvement; that benefits so essential demand the aid to our Representatives in the Legislature to insure them; and that those more immediately representing this district are peculiarly bound to promote its local interests by cooperating in the Legislature with the unanimous voice of their constituents in favor of vacating all the streets which interfere with the site proposed for the Navy Yard."[80]

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[79] In late 1945 James Forrestal, Secretary of the Navy, established the Naval Shipyards as the industrial part of the "Navy Yards." The term "Navy Yard' was discontinued. Naval Shipyards may provide ship construction or repair facilities. Some shipyards perform both functions. The Naval Shipyard includes only those buildings and facilities dealing directly with the overhaul, repair, construction and fitting out of ships. All of the Naval Shipyards were placed under the "management control" of the Bureau of Ships in the Navy Department. Shipyard Commanders are responsible to the Bureau of Ships.

A Naval Base was established at each of the old Navy Yards to manage military affairs. Military activities, naval personnel, their housing, assignments and documentation are administered by the Naval Base Commander. Vice Admiral James Laurence Kauffman, U.S.N., Philadelphia`s Navy Yards (1801-1948) (Philadelphia: Newcomen Society of England - American Branch New York, 1948): 6. Kauffman addressed the Newcommen Society at the Great Hall of the Franklin Institute in Philadelphia on the 242nd anniversary of Benjamin Franklin`s Birth, January 17, 1706. Kauffman was a member of the Newcomen Society and the Commandant of the Fourth Naval District, United States Naval Base Philadelphia.

[80] Resolution adopted by citizens of the District of Southwark, February 1801, as quoted in Vallette, History of the Philadelphia Naval Yard 1609-1884, a compendium of papers originally published in Potter's American Monthly Magazine, (January-October 1876): 3-4.

1884: "The question of abandoning League Island as a navy yard has been answered by the Navy Department and the Commission of experts in a way that must surprise all those who take an interest in the subject. The number of influential persons in this city who might feel called upon to make any effort to retain the Navy Yard here is perhaps small, for Philadelphia is a home of workmen, self-reliant and self-supporting. As a matter of historical interest, however, it may be well to recall the fact that Philadelphia has some right to refer to its long succession of able ship-builders . . . Only the Government can afford to forget that its navy won its first honors in Philadelphia-built vessels, and that its whole story is full of credit to its Philadelphia yard . . . Philadelphia is much better able to do without the Navy Yard than the Navy Department without Philadelphia."[81]

1964: "Those who are concerned with the welfare of the nation as well as of this area might be better advised not to resist the further transfer of work from naval to private shipyards-- if the economics of the situation justifies it-- but to concentrate instead on the case that, if there must be naval shipyard curtailment, it should occur elsewhere and not in Philadelphia . . . It is practically inconceivable that the entire Philadelphia Naval Base would ever be shut down, and it would be most difficult to shut down and dispose of the shipyard portion of the base while the rest of it remained in operation."[82]

1987: No one knows how long that promise [not to close the base] will last. In part it depends on the vagaries of military budgetary policy. But it may depend even more on the skill and dedication of the shipyard workers themselves. As the yard's former commander, Commodore Thomas U. Seigenthaler, once said, 'Political maneuverings cannot save the [shipyard] without strong facts to back them up. If we stay the best shipyard and then give the politicians something to work with, that's one thing. But to just depend on them, then you end up on top of the secretary of defense's list of cuts.'"[83]

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[81] Unsigned editorial in unidentified Philadelphia newspaper, 19 January 1884, appended to Vallette, History, passim.

[82]McLean, "Shipyards Await the Big Decision"

[83] "The Philadelphia Naval Shipyard: Work on a Grand Scale," Philadelphia Inquirer Magazine, (22 February 1987): 22.

APPENDIX B
ADVANTAGES OF LEAGUE ISLAND (1866)[84]

Fresh water port - Back channel would hold a thousand vessels

Secure -- Remote (80 miles from the sea) from the Sea (defensible). This was objectionable for sailing vessels but not for steam powered. The distance makes for a good engine test run. (With the advent of steam a location near the sea lost import)

Secure from storms

Adequate depth of water - same as Norfolk

Ample frontage 5 1/16 miles for dockage - greater than all other American yards combined and larger than any European Yard

Gravel beds underneath for better machinery foundation than stone

Skilled artisans nearby; markets & tenements

Generally ice was not a problem at League Island

Abundant space for buildings

Abundant supply of process and potable water

Close to supplies of naval stores (tar/pitch from the south)

Timber available from Delaware, New Jersey, Pennsylvania,
Maryland and Virginia

Anthracite and soft coal available via the Schuylkill (anthracite was exclusively used by the Navy)

Iron of Pennsylvania was shipped through Philadelphia

There were many skilled metalworkers in Philadelphia - lots of local industry to take up the slack when government work fluctuated

Vicinity to a large city: "The large number of workmen in the navy yard would be able to obtain the necessities of life cheaply, and when they were no longer needed by the government, could find ready employment in the city, without being obliged to leave their homes."

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[84] New England Man, Advantages, passim.

Protection of Iron Vessels from corrosion by storage in fresh water - no other yard or location was comparable

Good sea defenses at the Pea Patch Island, 32 miles below League Island and Fort Mifflin, two miles below

Good defense against domestic disturbance - connected only by a causeway to the mainland

Difficult to blockade - no anchorage at the mouth of the Delaware River. Only shallows behind the Delaware breakwater

Sea breeze keeps the Island cool in summer to the benefit of the workmen

League Island had a reputation as a healthy location

APPENDIX C
AUTHORIZED GENERAL WAGE SERVICE RATINGS FOR THE NAVAL SHIPYARD

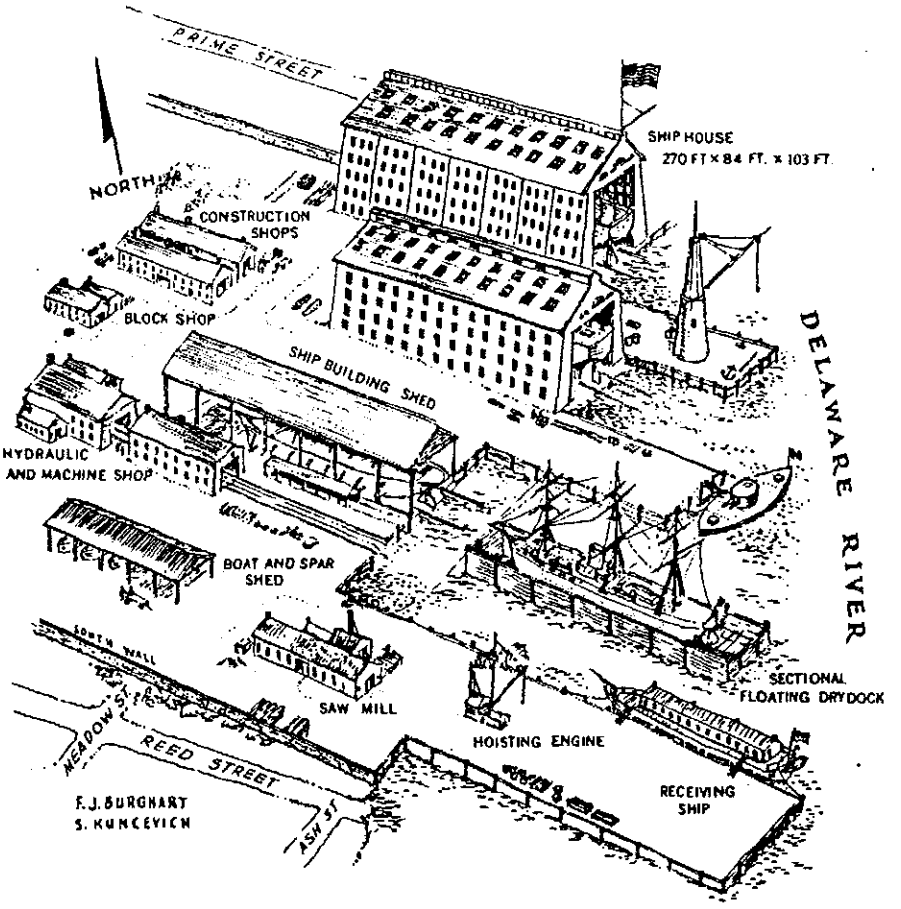
Anglesmith
Apprentice
Armature Winder
Asphalt or Cement Worker
Automobile Equipment Operator
Automobile Mechanic
Automotive Mechanic (Body)
Blacksmith (Heavy Fires)
Blacksmith (Other Fires)
Boatbuilder
Boiler Tender
Boiler Maker
Brakeman
Bridge Crane Operator
Buffer and Polisher
Cable Splicer
Caulker and Chipper
Carpenter
Cement Finisher
Chauffeur
Coppersmith
Crane Dispatcher
Crater and Packer
Diver
Electrician
Electrician (Power Plant)
Electrician (Telephone)
Electronics Mechanic
Electroplater
Elevator Mechanic
Elevator Operator
Engineman (Hoisting)
Engineman (Locomotive)
Fire Control Mechanic
Flame Cutter
Flame Cutter (Scrap)
Flange Turner
Forger (Heavy)
Forger (Light)
Foundry Chipper
Furnaceman (Heater)
Furnaceman (Heavy Forge)
Furnaceman (Other Forge)
Gardener
Gyrocompass Mechanic
Hammer Runner (Heavy)
Hammer Runner (Other)
Heat Treater
Heavy Duty Equipment Mechanic
Helper Automotive Mechanic
Helper Blacksmith (Heavy Fires)
Helper Blacksmith (Other Fires)
Helper Boilermaker
Helper Coppersmith
Helper Electrician
Helper Electronics Mechanic
Helper Flange Turner
Helper Forger (Heavy)
Helper (General)
Helper Heavy Duty Equipment
Helper Machinist
Helper Molder
Helper Painter
Helper Pipe Coverer
Helper Pipefitter
Helper Rigger
Helper Sheetmetal
Helper Shipfitter
Helper Toolroom Mechanic
Helper Welder
Helper Woodworker
High Lift Truck Operator
Holder On
Instrument Mech. Electrical
Instrument Mech. Electronic
Instrument Mech. General
Instrument Mech. Optical
Joiner
Laboratory Crafts Aide
Laborer
Laborer Cleaner
Laborer Heavy
Ladleman
Letterer and Grainer
Linoleum Layer
Liquid Fuels Distribution
Locksmith
Loftsman

Machine Operator
Machinist
Maintenanceman
Mason
Mechanic
Melter
Melter (Electric)
Mobile Equipment Dispatcher
Molder
Office Machine Repairman
Oiler
Ordinanceman (Guns & Mounts)
Packer
Painter
Patternmaker
Pest Control Equipment Operator
Pipe Coverer and Insulator
Pipefitter
Planner & Estimator (by trade)
Plasterer
Plumber
Power Plant Controllman
Production Dispatcher
Puncher and Shearer
Radio Mechanic
Railroad Conductor
Railroad Trackman
Refrigeration and Air Conditioning Mechanic
Rigger
Riveter
Riveter Heater
Roofer
Sailmaker
Sandblaster
Saw Filer
Scrap Material Sorter
Sewer
Sheetmetal Worker
Shielding Installer
Shipfitter
Ship Maintenance Mechanic
Ship Progressman (by trade)
Ship Scheduler (by trade)
Shipwright
Shop Planner (by trade)
Stevedore
Stockman
Test Mechanic
Tool & Cutter Grinder
Toolmaker
Toolroom Mechanic
Truck Driver
Truck Driver (Heavy)
Truck Driver (Heavy Trailer)
Upholsterer
Warehouseman
Welder
Welder (electric)
Welder (Gas)
Wharfbuilder

APPENDIX D

ILLUSTRATIONS

NOTE: Figure 2 withdrawn from Appendix D.



FRIGATES and their heavier sisters, ships-of-the-line, and even sloops of war, which never were sloops in rig, have passed to the attic of memory. Heavy spars and vast spreads of canvas no longer mark U. S. fighting craft. Gone, too, is the Nation's first Navy Yard, where these vessels were built.

It was born in 1800 between Front st. and the Delaware River below what now is Washington ave. (Earlier, of course, Philadelphia had fitted out the first squadron of the Continental Navy, which left the city in 1776.) But this was a permanent Yard, holding 18 acres, with 100-feet high buildings, spacious moulding lofts, and a nine-section dry dock. It lasted until 1876, when the present Philadelphia Naval Base was opened on League Island.

Figure 1
Philadelphia Naval Yard - Federal Street
1801-1876
(Source-Public Information Office Files)

Figure 3
Floating Dry Dock
Philadelphia Naval Yard - 1851
(Source: PSNY Archives)

Figure 4
Sketch of the Navy Yard - mid 19th century
(Source: PSNY Archives - drawn in 1960s)

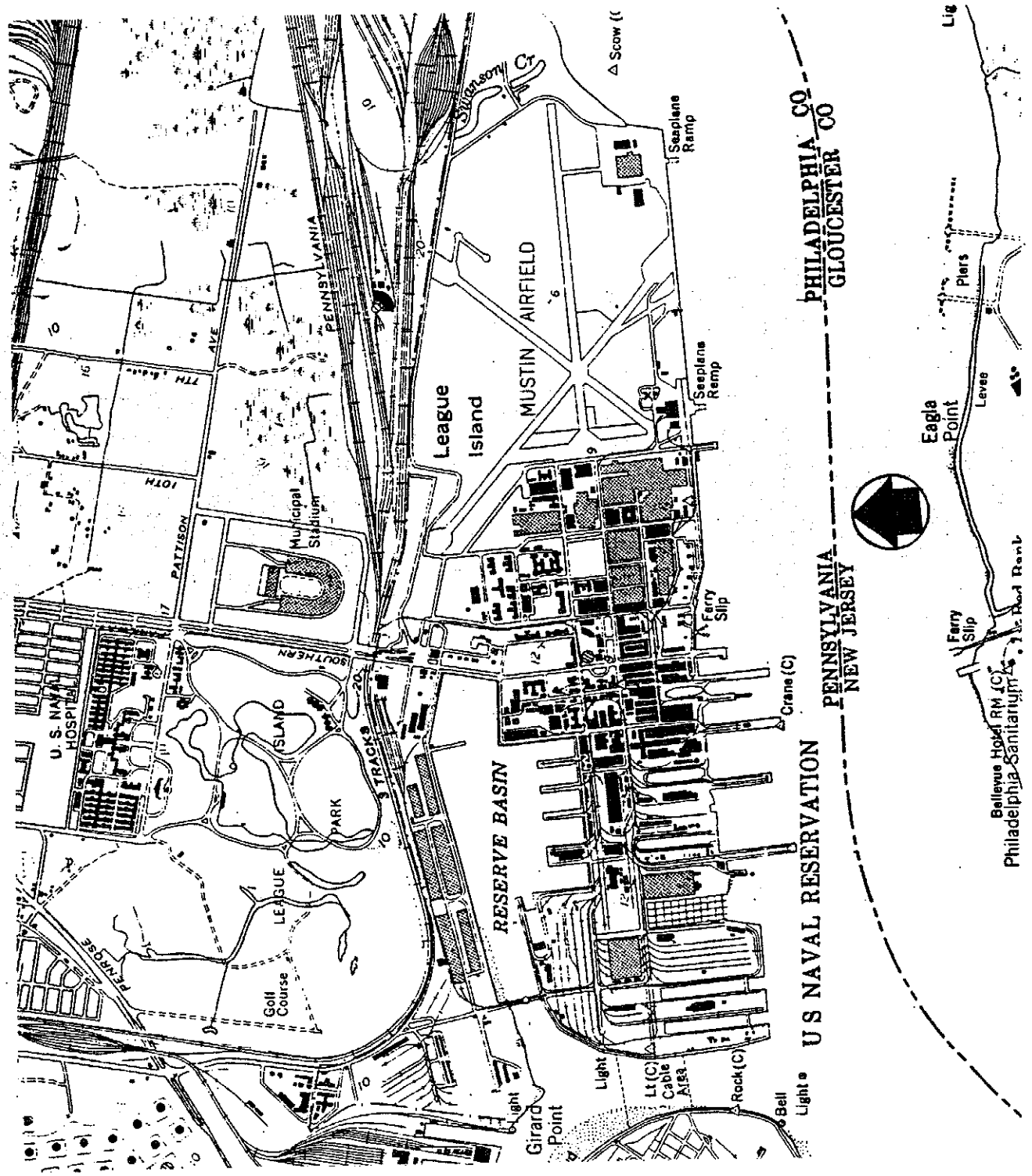


Figure 5
Location Map - Quad: Philadelphia, PA - NJ
Naval Base Philadelphia - Philadelphia Naval Shipyard

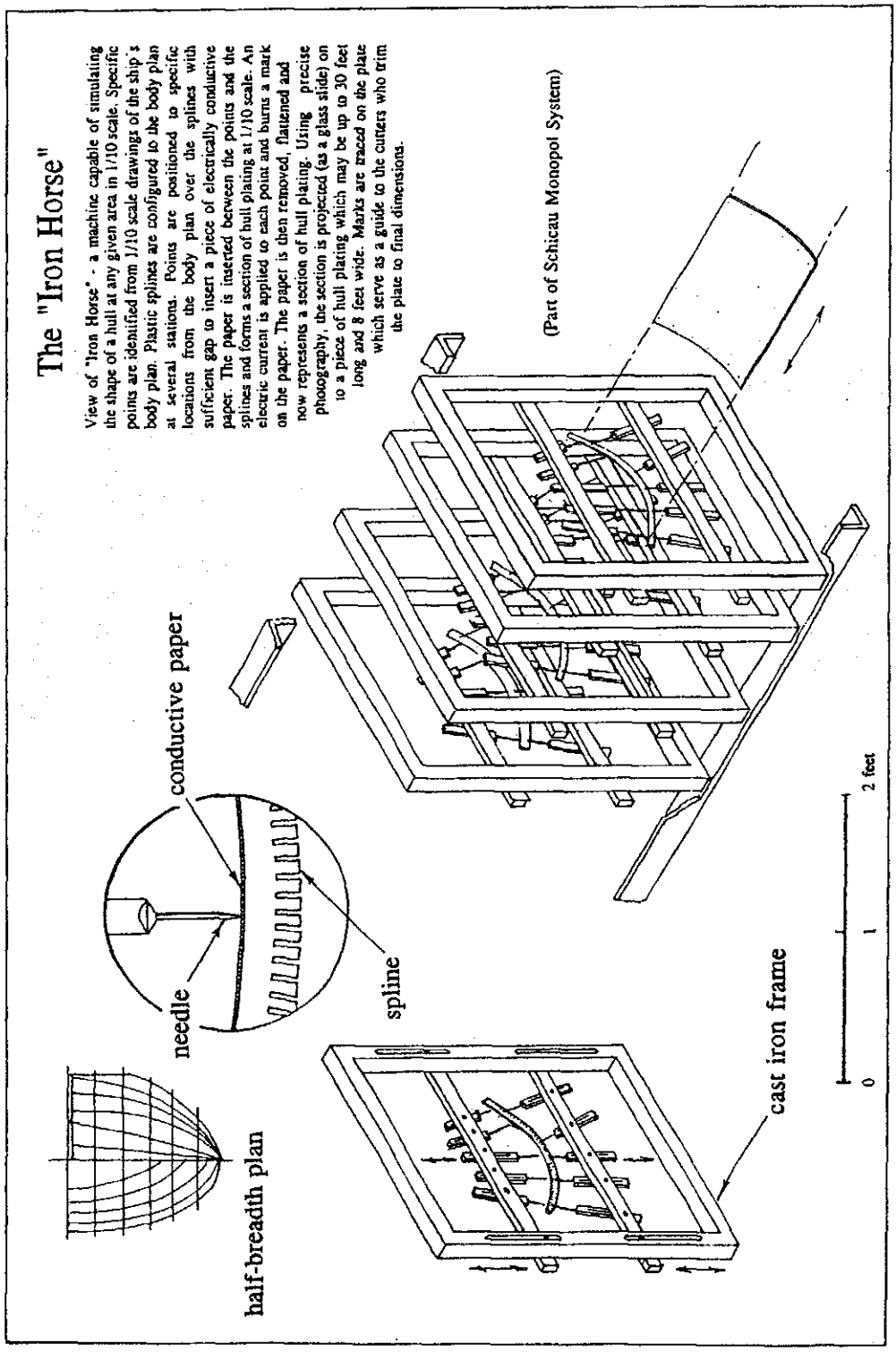


Figure 6
Optical Detailing - The "Iron Horse"
(Source: original Drawing by R.C. Stewart based on observation)

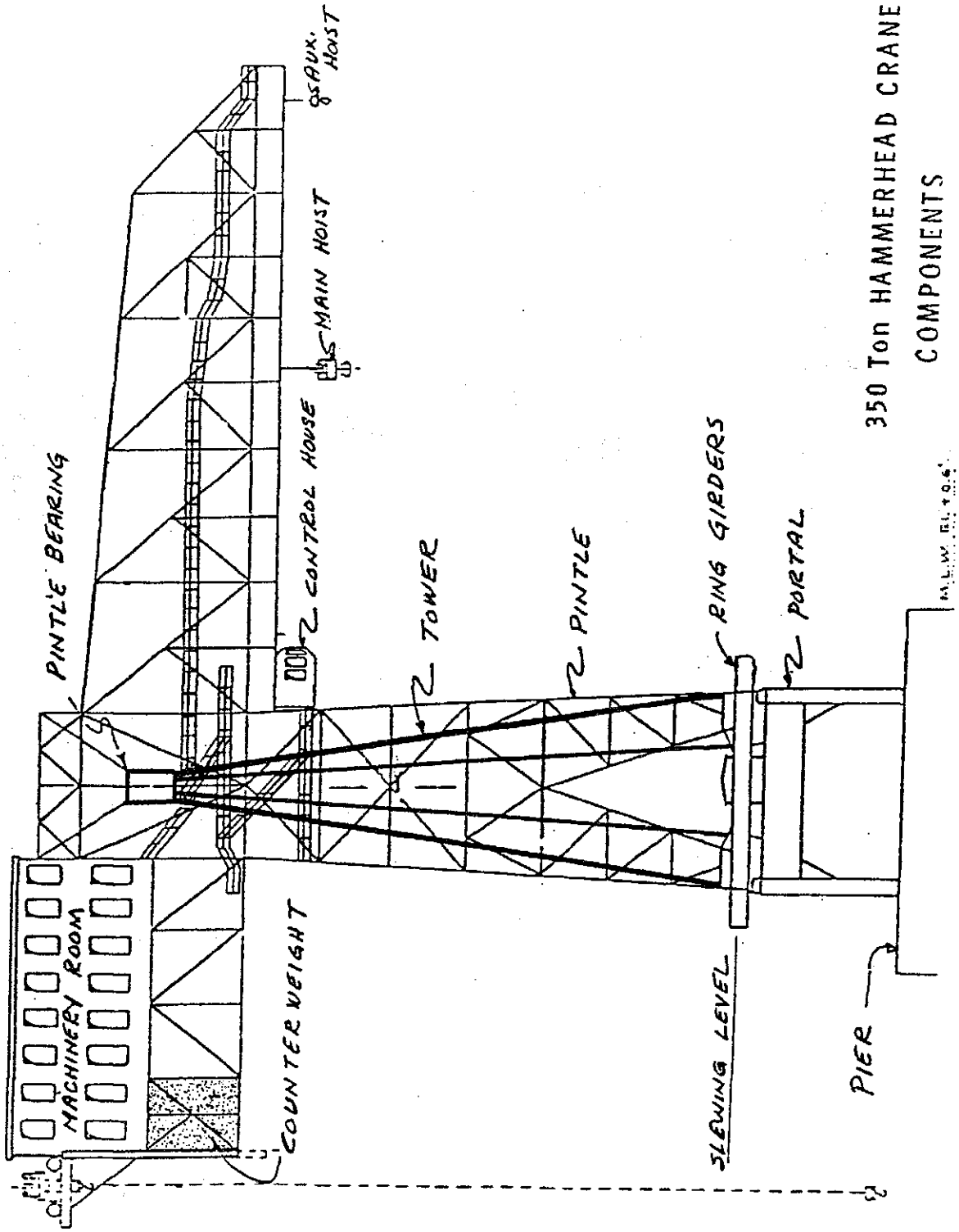


Figure 7
Sketch of 350 Ton Hammerhead Crane Operating Components
(Source-Crane Engineering Department-PNSY)

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